Upgrading options for Myanmar Fresh Ginger Value Chains

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Abstract

The agriculture sector plays a significant role in the economy of Myanmar and contributes 32 % to the country's gross domestic product (GDP). The current extent of the agriculture area in Myanmar is approximately 12 million hectares, occupying 18% of total cultivated land resources. Ginger (*Zingiber officinale* Rosc) is one of the export crops in Myanmar with the annual production volume of 66,085 tons from an approximate cultivation area of 4,985 hectares. It is grown by smallholder farmers and offers major economic opportunity for more than 6,000 households in the Southern Shan State of Myanmar. Myanmar ginger production is only 3% of the total world ginger production. Although world demand for ginger is growing, exports from Myanmar are declining with 60 % of production has to be exported to low price regional markets with unstable demand and volatile prices. Hence, Myanmar needs to find out how to upgrade the fresh ginger value chains to export to high price markets such as the USA and the EU.

This current study aims for a better understanding of the existing Myanmar fresh ginger value chain from production to end markets in overseas. Therefore, the present study investigated the constraints and opportunities of current Myanmar fresh ginger value chains along with identifying the upgrading options. Data from primary and secondary sources were used in this study by using a qualitative approach. Data were collected through semi-structured interviews, mailed questionnaires and document collection methods.

Being a non-priority crop in Myanmar, the ginger sector has been paid little attention by the Government and hence, very limited research and development on the Myanmar ginger sector has been conducted. In order to export fresh ginger to high price markets, Global-GAP or organic certificates are required. The major constraints faced by the ginger value chain actors for achieving those certificates are found to be the long-term use of chemical herbicides and lack of technical awareness of integrated pests and disease management protocol. Apart from that, the present status of harvesting and post-harvest handling practices is also a constraint for achieving those certificates. An unreliable export market, high price volatility and cashflow constraints are major limitations faced by the value chain actors. Exchange rate volatility is a key constraint faced by exporters. Cold chain facilities and

limited access to international banks, are both major issues for exporting Myanmar fresh ginger to high price markets.

Introduction of appropriate financial market based instruments to overcome cashflow constraints would encourage farmers to adopt better production practices and timing of harvest. Additionally, the government participation in multi-disciplinary research, along with NGO support in the ginger sector, is found to be essential for upgrading the fresh ginger value chain in Myanmar. Increased collaboration between the public and private sectors, such as improvement of logistic facilities in the country, is recommended to improve the Myanmar fresh ginger sector. Such collaboration should assist in the aim for effective exports to the high price and reliable markets in the near future.

Key words: Myanmar, fresh ginger value chain, smallholder farmers, production, harvest, post-harvest practices

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List of Abbreviations

GDP	Gross Domestic Product
HDI	Human Development Index
LIFT	Livelihood and Food Security Trust Fund
FAO	Food and Agriculture Organization
MOALI	Ministry of Agriculture, Irrigation and Livestock
MAFF	Ministry of Agriculture, Forestry and Fisheries
DOA	Department of Agriculture
NGOs	Non-governmental Organizations
ILO	International Labour Organization
WHO	World Health Organization
USAID	The United States Agency for International Development
MEDA	Mennonite Economic Development Associates
GEA	Green Eastern Agriculture
USA	United States of America
UK	United Kingdom
EU	European Union
LDCs	Least Developing Countries
SDT	Substantial and Differential Treatment
EBA	Everything But Arms
FDI	Foreign Direct Investment
USDANOP	United States of Department of Agriculture's National Organic Program
JAS	Japanese Agricultural Standard
CAGR	Compound Annual Growth Rate
ANSAB	Asia Network for Sustainable Agriculture and Bioresources
BRC	British Retail Consortium
CBI	The Centre for the Promotion of Imports from developing countries
OSH	Occupational Safety and Health
USFDA	United States of Food and Drug Administration
VCA	Value Chain Analysis
Global-GAP	Global Good Agriculture Practices
SQF	Safe Quality Food

FVCA	Food Value Chain Analysis
QDA	Quality Data Analysis
MMK	Myanmar Kyat
VCRD	Value Chains for Rural Development
EM	Effective Micro-organisms
CO_2	Carbon dioxide
MFAT	Ministry of Foreign Affairs and Trade

Chapter 1: Background of the Study

1.1. Background Information

The agriculture sector plays a significant role in the economy of Myanmar and contributes 32 % to the country's GDP, 56% to employment, and 21 % to exports (Raitzer *et al.*, 2015). It is the backbone of the country where 70 % of the total population live in rural areas and their main livelihood is agriculture (SANYU Consultants INC, 2013).

However, the Myanmar agriculture sector is facing a number of challenges. According to a survey conducted by LIFT in 2012, approximately 90 percent of households sell their crops individually and have faced the lack of bargaining power with buyers. Most of these households have limited access to market information for sale processes of their produce that includes price information, and usually get the information from their friends and buyers. Approximately 62 percent of households sell the crops immediately after harvest, whereas only 17 percent of households sell their crops two or more months after harvest (FAO, 2016). In Myanmar, the lack of coordination among each and every actor along the supply chain has caused fragmented value chains, leading to shrinking profits for each actor throughout the chains (MOALI & MAFF, 2017). Hence, FAO (2016) advised to make improvements in agriculture-based commodities' value chains, particularly in post-harvest systems, processing and marketing of crops.

Major crops produced in Myanmar are rice, maize, pulses, oil seed crops and industrial crops such as cotton, sugarcane and rubber. In addition to these crops, Myanmar also grows chili pepper, garlic, onion, ginger, turmeric, and potato as kitchen crops, and fruits such as mango, banana, citrus, durian, pineapple, and vegetables for both domestic and export use (Lwin, 2015). The current agriculture growing area is approximately 12 million hectares, occupying 18% of total cultivated land resources (Lwin, 2015). Among them, about 3.64 million hectares of agricultural land are currently operated by the smallholder farmers and the average size of their landholdings are less than two hectares (Kyu, 2014).

The ginger crop is one of the export crops that has potential to expand its markets due to its high demand in the world market while favorable climatic conditions are prevailing in

Myanmar (Winrock International, 2016). Ginger is annually grown on approximately 4,985 hectares with the annual production of 66,085 tons (ILO, 2017). Ginger is usually grown by smallholder farmers and it offers major economic opportunity for more than 6,000 households in Southern Shan State of Myanmar (Winrock International, 2016). There are many opportunities for the expansion of the Myanmar ginger industry under the present trend of increasing demand for ginger products in the world, while the present contribution of Myanmar ginger production is only 3% of total world ginger production (Htwe, 2017).

Myanmar consumes 40 % of its ginger production and 60 % is exported as fresh as well as dried ginger, particularly to India, China, Pakistan and Bangladesh (Winrock International, 2016). According to the statistics of the Ministry of Commerce, about 8,000 tons of fresh ginger was exported in the 2008-2009 financial year, receiving foreign income of US$ 900,000 and then, the export volume grew into 9,200 tons in 2009-2010 and 9,900 tons in 2010-11, with the earning of US$ 1.4 million and US$ 2 million respectively. India and China are the largest ginger producers-cum-exporters, but they also buy ginger from Myanmar due to the lower price of US$ 300-400 per ton that is much smaller than the international price, which is US$ 1,850-2,500 per ton (Mulderij, 2017). According to Kyaw (2011), exporters in Myanmar advised that they sell the fresh ginger at US$ 300-400 per ton for fresh ginger and at US$1450-1600 per ton for dried ginger. Myanmar exports ginger worth US$ 3 million to Bangladesh yearly (Ko, 2017). In addition to these markets, there are a high number of exporters who are preparing dried and sliced ginger for export markets in the EU, mainly Germany and the Netherlands. It also mentioned that importers in the EU make value-added products and then re-export to other countries in the EU (Winrock International, 2016).

According to FAOSTAT data from 2000 to 2016, the world's ginger demand is growing rapidly, however, export of ginger by Myanmar has declined. Not only ginger farmers in Myanmar have low bargaining power with the middle agents, but also the ginger exporters from Myanmar receive the price offered by the international markets. This seems to be attributed with limited access to market information such as requirements of the high price markets like the EU and the USA. Moreover, lack of coordination among the farmers, middle persons and exporters in the value chains deteriorate the ginger quality during the market process of export for specific purposes. For example, ginger for fresh consumption should be harvested during 180-195 days after planting and further maturity causes the unnecessary

increase in crude fibre content and decrease in protein and fat content (Vasala, 2012). Nevertheless, farmers are not fully aware of that and, consequently, Myanmar ginger gets a lower price in international markets and many farmers are compelled to depend on low prices from regional markets such as India, Bangladesh and China. Furthermore, the limited relationship between the value chain actors, along with unreliable market information, causes the Myanmar ginger sector to be underperforming (Kyaw, 2011). Additionally, limited research information on ginger in Myanmar is available for informed decision-making and, hence, only a few recommendations and suggestions can be made by producers as well as exporters on how they can secure the maximum profitability from ginger production and trade.

On the other hand, there are many opportunities to expand and upgrade Myanmar's current ginger value chains. For example, current growth of the fresh products export market in developed countries is a good opportunity for developing countries, including Myanmar, that have a low processing capacity but have favorable agro-climatic growing conditions (Roy & Thorat, 2008). Apart from that, changes in the global economy bring new constraints as well as opportunities for smallholder farmers to enter into the global markets (Markelova & Mwangi, 2010). Meeting these challenges and capturing the opportunities means formally organizing agribusiness value chains so that the actors are able to deliver the products required by the global buyers and food safety regimes (Humphrey & Memedovic, 2006a). Another opportunity for Myanmar is that its proximity to major ginger importers, such as Pakistan and Japan, suggests that fresh products can be delivered in a short time with low transportation costs. Nevertheless, there might be high competition from China and India, which are the biggest ginger producers-cum-exporters and have the similar advantages of proximity to these large ginger importers.

In contrast, Myanmar has few other competitive advantages over China and India in agricultural production sector, that is, large arable land resources, sufficient water resources and cheap labor, making it possible to produce the ginger at a lower cost of production and offer lower prices than China and India (Raitzer *et al.*, 2015). Apart from that, Myanmar belongs to the status of the Least Developing Countries (LDCs) and, therefore, it has Special and Differential Treatment (SDT) in exporting its products to industrialized countries such as the EU, Japan and the US under the initiative of "Everything But Arm" (EBA). The EU is the largest importer of spices, followed by North America, then Eastern Asia. More importantly,

ginger accounts for a total of 5% of the EU imported spices and herbs and its imports increased by 16 % and 12 % annually in terms of value and volume respectively, reaching € 250 million in 2017 (Ministry Of Foreign Affairs, 2017). According to Profound-Advisers In Development (2009), the majority of the origin of imported EU spices are from developing countries, and the tariff on raw materials, particularly from the LDCs are generally low, providing a great opportunity for Myanmar fresh ginger to be exported. In addition, tax for the export of goods from Myanmar is only 2% (VDB Loi, 2018). Hence, Myanmar needs to exploit as many as possible number of the above-mentioned advantages to increase its ginger export to the world's large importers like Pakistan, Japan, the EU and North America. Ultimately, an improvement of the ginger value chains would be beneficial for all stakeholders of the Myanmar ginger sector, including smallholder farmers which, in turn, would no doubt lead to an improvement in their living standards.

In Myanmar, the fresh ginger value chain is a loosely organized chain when compared to the processed ginger value chain. Moreover, the Transparent Market Research (2017) found that demand for fresh ginger will be greatest in the near future, with high predicted demand of 7.30% CAGR between 2017 and 2022. Therefore, fresh ginger is selected for this study. Since the aim of this study is a better understanding of how Myanmar fresh ginger value chains can be upgraded for high price markets, there would be more constraints and opportunities in addition to the facts shown in this introductory review. In this context, a formal research study would be warranted on the existing Myanmar fresh ginger value chain.

1.2. Research question

- What are the upgrading options for the Myanmar fresh ginger value chains?

1.3. Research Objectives

- To map the current Myanmar fresh ginger value chains
- To analyze the fresh ginger value chains in Myanmar
- To identify constraints and opportunities of the Myanmar fresh ginger value chains
- To identify upgrading options for the Myanmar fresh ginger value chains

Chapter 2 : Context

2.1. Study Country

Myanmar, known as the Republic of the Union of Myanmar, is located in the south-eastern region of Asia and bordered by the Andaman Sea and the Bay of Bengal to the south and southwest (ITC, 2014). It shares borders with China in the north and northeast, Laos in the east and Thailand to the southeast, Bangladesh in the west and India in the northwest (Steinber *et al.*, 2018). The area is 676,578 sq, km with a population of 51,486,253 in 2014, and it is projected that the population will reach 59,399,039 in 2030 (Department Of Population, 2017). There are eight main ethnic groups along with sub-diverse groups which speak more than 100 languages. The capital city is Nay Pyi Taw, and the largest city and commercial city hub is Yangon.

Figure 2-1:Regional Map showing the location of Myanmar

Source: (FAOSTAT, 2017)

The country is identified as one of the Least Developed Countries (LDCs) by the United Nations classification system (World Bank, 2018). Although the country's average poverty rate is 26 %, the rural population have faced it twice as much as the urban areas (UNDP, 2018). In terms of the Human Development Index (HDI), it was 0.556 in 2015 and lies under

the category of medium human development, positioned at 145 out of 188 countries and territories (UNDP, 2016).

Myanmar has four key competitive advantages in the agriculture sector, which play a significant role in the economy of Myanmar. They are abundant land, water, labour resources and proximity to major future food markets, China and India. The size of the agricultural land is quite large, having an existing 12.8 million hectares with the potential of expanding to an additional 50 % of current cultivated land size. The water resources of Myanmar are considered plentiful due to having four major rivers and their related system. In terms of labour, it can be described that Myanmar's agriculture has moderate labour resources when compared to other Asian countries because 56 % of the workforce is involved in the agriculture sector. The minimum wage of Myanmar is the lowest among the Southeast Asia countries and, thus, the labour is inexpensive for the agriculture sector (Raitzer *et al.*, 2015). Moreover, the agriculture sector has the largest contribution to the GDP of the country and the following figure shows different sectors that contribute to the GDP of the country.

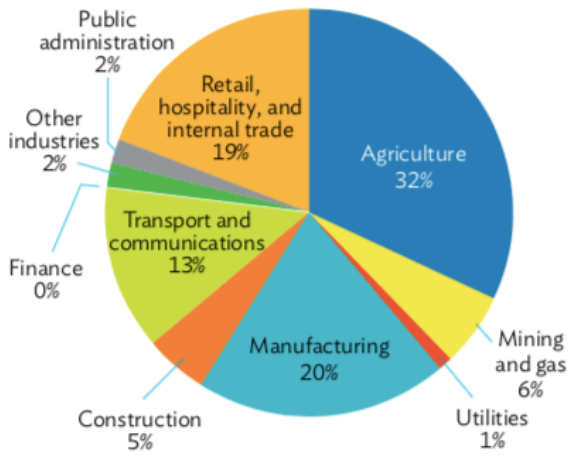


Figure 2-2:The proportion of GDP contributed by different sectors in Myanmar

Source: Myanmar: Unlocking the potential country diagnostic study (ADB,2014)

Although the agriculture sector contributes 32 % to the country's GDP, it is underperforming owing to several challenges. The lack of coordination among different institutions involved, as well as limited funds for research and extension, are major constraints for the improvement of Myanmar's agriculture sector (FAO, 2016).

In term of agriculture commodities export, it contributed 17 % to total country exports in 2011 (Raitzer *et al.*, 2015). Ginger is one of the export crops to the EU, the USA and also has border trade with India and China (Winrock International, 2016).

2.2. Ginger

2.2.1. History of domestication and general introduction of Ginger

Ginger, botanically knows as *Zingiber officinale* Rosc., belongs to the family Zingiberaceae (Nair, 2013). There are 52 genera and 1,200 species under the Zingiberaceae and they are found predominantly in Asia and the Pacific region (Yeats, 2013) The botanical name, Zingiber, is derived from ancient Tamil (one of the regional languages of Southern India – Tamil Nadu) words, Ingiver, meaning that ginger is a rhizome. Some authors stated that the term Zingiber derived from the ancient Indian Sanskrit, singavera, which means antler-like or horn-shaped, indicating the shape of the rhizome (Singh & Dhillon, 2015).

Therefore, it is widely believed that ginger has originated from the Indian sub-continent because a large number of varieties of ginger, as well as their wild relatives, are available in this area (Bromand, 2017). It has also been noted that ginger has been grown in India and China since ancient times and was then brought into the Mediterranean region by the first century traders (Valenzuela, 2011). Ginger is an important commercial spice in tropical and subtropical countries, particularly in South Asia (Islam *et al.*, 2012). It is highly valued for its medicinal components which are extractable oleoresins, many fats, carbohydrates, vitamins, minerals and medicinal compounds such as antioxidants, flavonoids and many minor phytochemical components which are considered as anticancer agents (Ghasemzadeh *et al.*, 2011). Ginger is commercialized for its aromatic rhizomes, which are also used as a spice as well as an essential ingredient for many medicines (Kaushal *et al.*, 2017).

2.2.2. Ginger Varieties and cultivation

Depending on the countries and their geographical content, the ginger varieties cultivated are different. In India, Kuruppampady ginger is famous due to its superior quality of more fingers than average and high oleoresin content. The other varieties grown in Kerala are the medium plump low-fiber variety “Maran” and the plump “Himachal” variety, which are good

for dried ginger purposes (Vasala, 2012). Cochin and Calicut dried ginger, which is exported around the world, is produced from the local varieties such as Kuruppampady, Cheranad, Erenad and Wayand (Bag, 2018).

Generally, three types of ginger varieties are found in Myanmar, but the variety names are differentiated by their regional name regardless of analysis of oleoresins, oil content, fibre or dry matter content of each type (Winrock International, 2016). The "Rangoon variety" with low fibre and water content has medium pungency and is preferred by the processors for making dried ginger because this variety gives a higher percentage of dried ginger yield. The variety is medium in size and has well spread fingers. The variety called "Chinese variety" is preferred by fresh ginger traders as it is less pungent and has a high water content. The rhizome is large and has a pale yellow colour. The "Pink ginger" is a small, wild type of ginger and used for making traditional medicine and beverages. Traditionally, pieces or portions of rhizome are used as seeds for cultivation purposes by the farmers in Myanmar. The seed rhizome is sourced on-farm from the previous crop (ILO, 2017).

Rangoon variety

Chinese variety

Figure 2-3:Varieties grown by ginger farmers in study area

(Photos were taken during data collection stage)

2.2.3. Harvesting

The ginger crop is usually harvested about eight months after planting (Nair, 2013). The age of leaves and bulbs (rhizomes) size are important measurements which are used to determine the harvest time (Bag, 2018). However, harvest time varies, depending on its usage. For fresh and preserving purposes, ginger is usually harvested at the stage when it is low in pungency and fiber content in rhizomes, which is before the fully-mature stage. For dried and oil products, it is harvested at the fully-mature stage, when the leaves turn yellow (Plotto, 2002). Delay in harvesting can reduce the ginger quality and increase the fiber content, limit the storage life and increase the sprouting (Farm Africa, 2013). Normally, it is harvested when the leaves turn yellow and have dried down completely (Valenzuela, 2011). In China, it is harvested from April to June, then transported to the processing units in order to be exported (Nair, 2013).

In Myanmar, ginger is usually harvested between November and December of each year and some famers leave it in the field for three to four months without harvesting, depending on the market price. The average yield is approximately 1.6 tons per hectare (Htwe, 2017).

2.2.4. Products of Ginger

There are six forms of ginger in the markets: fresh ginger, dried ginger, pickled ginger, preserved ginger, crystallized ginger and ground ginger (Simonyan *et al.*, 2013). As for consumption, both mature and immature forms of fresh ginger are consumed while preserved ginger is made only from immature rhizomes. In Myanmar, ginger is mainly traded in a fresh form, but it can also be processed in a variety of products, such as dried ginger, bleached dried ginger, ginger powder, ginger oil, ginger oleoresin, ginger ale, ginger candy, ginger beer, brined ginger, ginger wine squash, and ginger flakes (Garcia & Lwin, 2015).

2.2.5. Sorting and grading

Sorting and grading are done based on the size, colour and shape of the rhizomes (Nair, 2013). In India, the first grade, which is known as ‘Gola” in the local market, possesses high dry matter content and low fiber content (Nair, 2013). It is highly demanded in the Indian market due to its full size and unbroken rhizomes (Farm Africa, 2013). The second grade, “Gatti” includes bits of bold, round to oblong pieces, which are smaller than the “Gola”

variety (Nair, 2013). It is of average quality and can be easily sold in the local market. The third grade are smaller in size with low dry matter and high fiber content. Generally, it is not consumed as fresh ginger but is used for pickle and other processing industries (Farm Africa, 2013).

In terms of export, Indian ginger, *Calicut* and *Cochin,* are categorized into three grades: special, good and non-special grades, depending on the size of the rhizomes and the content level of the extraneous material. In the case of Nepal, only a small number of commercial traders grade ginger based on the size which is required by the market (Vancura *et al.*, 2014). Grading and sorting is mostly done by the exporters, but it is usually exported to India without cleaning and grading (ANSAB, 2011). In some ginger growing areas in India, such as Meghalaya and Assam, farmers carry out cleaning, washing, manual grading into small, medium and large, depending on the size of the rhizomes (Small Farmers'Agribusiness Consortium, 2012). In Myanmar, cleaning and grading of ginger is usually done by the local traders (Garcia & Lwin, 2015).

2.2.6. Ginger marketing and its constraints

Producing ginger aimed for market requires some basic skills and assets such as road infrastructure, communication facilities, production techniques, capital inputs, market information and other requirements demanded by the markets (Farm Africa, 2013). A major factor that determines export potential of ginger is quality, which is measured based on fibre, volatile oil and non-volatile or extract contents (Nair, 2013). Most ginger farmers in developing countries are usually suffering from lack of required awareness to enter into high price markets. For example, in the value chain of Nepal ginger, farmers are involved in only a small portion of the whole chain, which is the production part. The rest of the chain are operated by many intermediaries such as input suppliers, local processors, road-headed traders, national traders, national processors, commission agents, exporters, wholesalers and retailers (ANSAB, 2011).

Similarly, ginger farmers in Ethiopia have been involved in only a small part of its value chain and most of the parts are operated by the middlemen, wholesalers, suppliers, retailers and cooperatives who have access to market information (Farm Africa, 2013). Geta and Kifle (2011) reported that many actors in the value chain have been severely affected by the

fluctuation of market prices for many years. Moreover, smallholder farmers in developing countries usually fail to meet the standards of importing countries. Some examples of these standards include Global Food Standard of the British Retail Consortium (BRC), Global-GAP and standards defined by the American Spice Trade Association (Farm Africa, 2013).

2.2.7. World ginger production

The estimated world ginger production was 100,000 tons in 1980s which increased to 2,025,571 tons in 2011 from production areas of 314,350 hectares (Farm Africa, 2013). The main ginger-growing countries are India, China, Jamaica, Taiwan, Sierra Leone, Nigeria, Fiji, Mauritius, Indonesia, Brazil, Costa Rica, Ghana, Japan, Malaysia, Bangladesh, the Philippines, Sri Lanka, Solomon Islands, Thailand, Trinidad and Tobago, Uganda, Hawaii, Guatemala, and many other Pacific Ocean Islands (Nair, 2013).

According to FAO (2017), world production of ginger reached 3,766,389 tons in 2016. The following figure shows the world ginger production from 2000 to 2016.

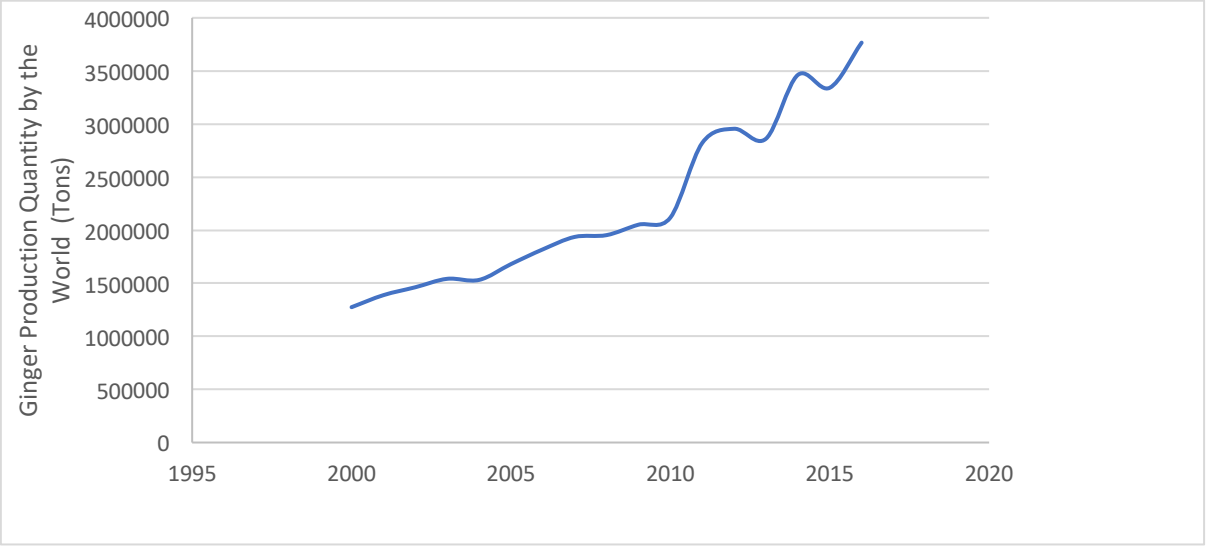


Figure 2-4: World Ginger Production from 2000 to 2018

Source: FAOSTAT

In 1996-97, India, alone, produced 232,520 tons from the production areas of 70,910 hectares and exported 28,321 tons in 1997-98 (Plotto, 2002). India shared 15.08 % of the world production in 1997-98 and then declined to 2.8 percent in 2008-09 (Karthick *et al.*, 2015). The negative growth also continued until the 2011-12 period. That negative growth

might be due to shifting ginger areas into other commercial crops or adoption of new areas under the shifting cultivation in Northeastern region, which holds a dominant position in ginger production in India (A. Sharma, 2015). However, India still stands in a dominant position of ginger supply to the world market. The annual average ginger production of India is 655,000 tons with the production areas of 133,000 hectares and, hence, ginger plays an important role in earning foreign money for the country (Babu *et al.*, 2017). The other major producer, China, grows ginger over 200,000 hectares, yielding more than 8 million tons annually. The production areas of China increased by 8% and reached up to 232,666 hectares in 2016 (Produce Report, 2017). The global revenue from ginger production was US$ 2,956 million in 2015 (FAO, 2017).

2.2.8. World Ginger Consumption

Since people are becoming aware of the benefits of ginger consumption, worldwide consumption of ginger has grown rapidly (Smits, 2015). According to Index Box Marketing and Consulting, the major ginger consuming countries in 2015 were India (32%), Indonesia (11%), Nepal (9%), Nigeria (8%) and China (5%), accounting for 65% of the global consumption (Andreeva, 2017). The following Table shows the top ten ginger-consuming countries in 2015.

Table 2-1:Top Ten ginger consuming countries in 2015

Rank	**Country**	**Consumption (1000 tons)**
1	India	790.6
2	Indonesia	268.6
3	Nepal	221.6
4	Nigeria	202.5
5	China	129.9
6	Japan	125.8
7	Thailand	106.8
8	Pakistan	89.3
9	USA	71.5
10	Bangladesh	63.2

Source: (Andreeva, 2017)

Similarly, European countries are also big consumers and their consumption has increased rapidly in the recent past years because of the health benefits of ginger, particularly during winter (CBI, 2017). The whole of Europe imports ginger mainly from China, Brazil and Thailand (Smits, 2015). In 2016, the import of dried ginger by the EU reached 152,000 tons and the import value has increased by 19 % annually (Ministry Of Foreign Affairs, 2017). Figure 2-5 below shows the leading EU importers of dried ginger from 2012 to 2016.

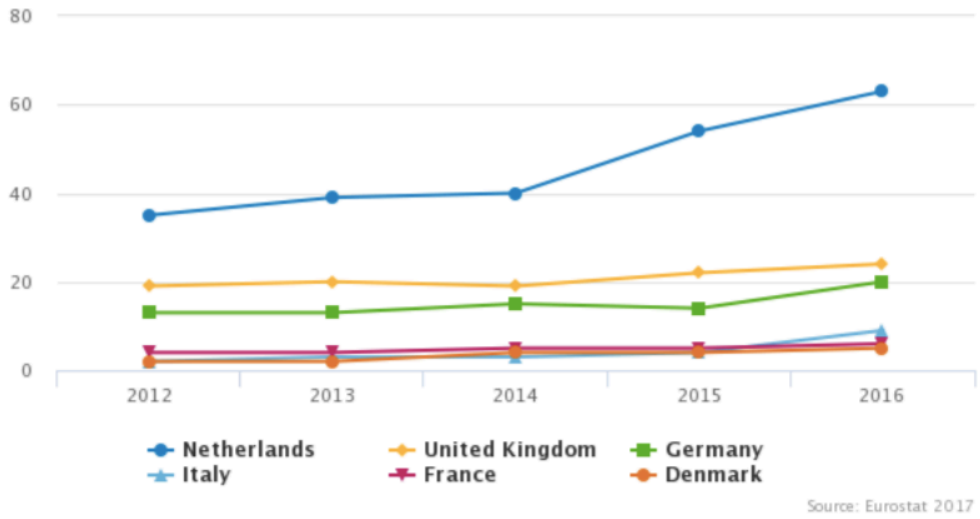


Figure 2-5: Leading European importers of dried ginger (In 1,000 tons, 2012-2016)
Source: Exporting dried ginger to Europe (Ministry Of Foreign Affairs, 2017)

During the period of 2016-2017, the consumption of ginger by Europe peaked due to cold weather (Ministry Of Foreign Affairs, 2017). The price of dried and powdered ginger at the international market ranges from US$ 6,000 to 7,000 per ton (Mulderij, 2017). The price of Chinese fresh ginger in France is around 1.85 Euro per kilogram and the price of organic ginger is between 3.6-6.25 Euro per kilogram (Mulderij, 2017). In 2016, about 72 % of European's ginger import was from developing countries, whereas 96 % of Dutch imports, alone, were from developing countries. Between 2012 and 2016, ginger exports to Europe by Peru, Indonesia, Pakistan and Myanmar had increased by 85 %, 85 %, 56 % and 55 % respectively (Ministry Of Foreign Affairs, 2017).

Recently, international demand for ginger has been driven by the population growth, higher income and diversification of diet, along with its health benefits and more recipes with ginger are appearing (Index Box, 2018). Therefore, a good opportunity exists for the Myanmar

ginger sector to increase its production along with the quality improvement required by the markets.

2.2.9. Ginger Import and Export

In global trade, ginger represented 15-16% of imported spices during 1996-2000 (Plotto, 2002). In 2015, major ginger importing countries were Pakistan (89,000 tons), USA (73,000 tons), Japan (61,000 tons), the Netherlands (47,000 tons) and Malaysia (38,000 tons) (Avramenko, 2017). Figure 2-6 shows the quantity of ginger imported by the world during the sixteen-year period of 2000-2016.

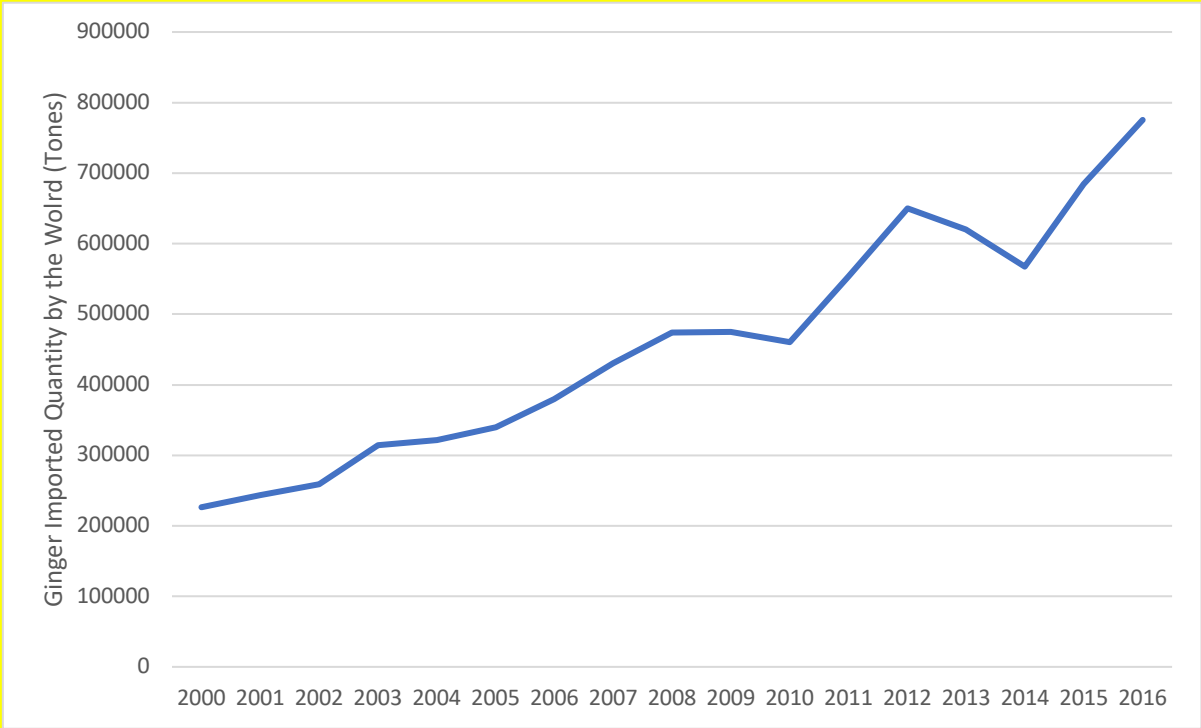


Figure 2-6: Ginger Import by the world (2000-2016)

Source: FAOSTAT Crop and Livestock products

Ginger imports by the United States of America are also growing steadily and most of their imports come from China, followed by Brazil, Peru and then other countries as shown in the following bar chart (Figure 2-7).

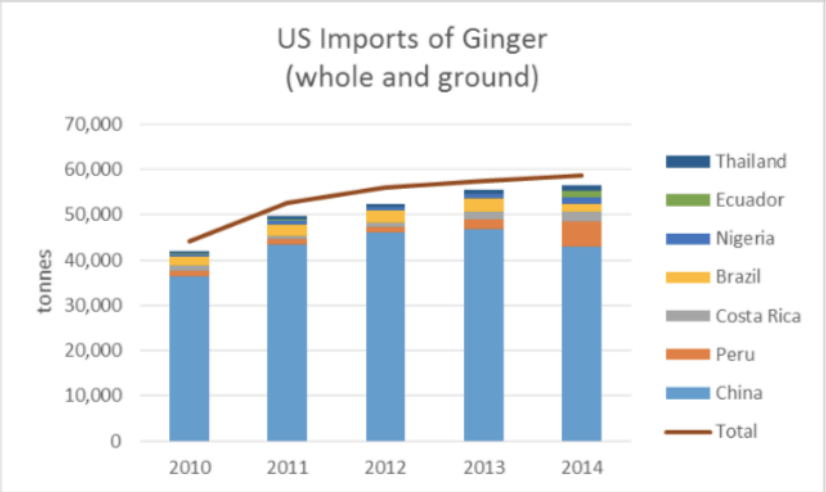


Figure 2-7: Ginger Imports by the USA from 2010 to 2014

Source: ITC US Spice Imports

On the other hand, major exporting countries are China, India, Nigeria, Ethiopia and Thailand, along with an increased annual average price rate of 2.8% over the past ten years (Index Box, 2018). The world price of ginger is usually determined by China due to its massive production and supply to the world market (Mulderij, 2017). Its production area and yield increased up to 232,666 hectares with an approximate yield of 9.38 million tons in 2016. Its major export destination regions are the Middle East, South East Asia, Europe, the USA, Japan and South Korea (Produce Report, 2017). China is the main supplier of both whole and ground ginger to Europe and in 2016, Europe imported a total dried ginger amount of 152,000 tons (Ministry Of Foreign Affairs, 2017).

2.2.10. Ginger quality desired by the world market

In term of quality, Jamaica and Indian ginger are considered the best ginger, followed by the West African ginger. Indian ginger that enters the world market is known as “Cochin and Calicut” ginger and has a lemon-like flavour, low fibre content and high moisture content (Vasala, 2012). According to the Indian Marketable ginger classification, the fibreless ginger variety has a better market when compared to the fibrous one (Hawassa, 2013). Ginger buyers in developed countries, such as the USA and European countries, wish to pay more attention to their responsibilities for the social and environmental impacts of their activities.

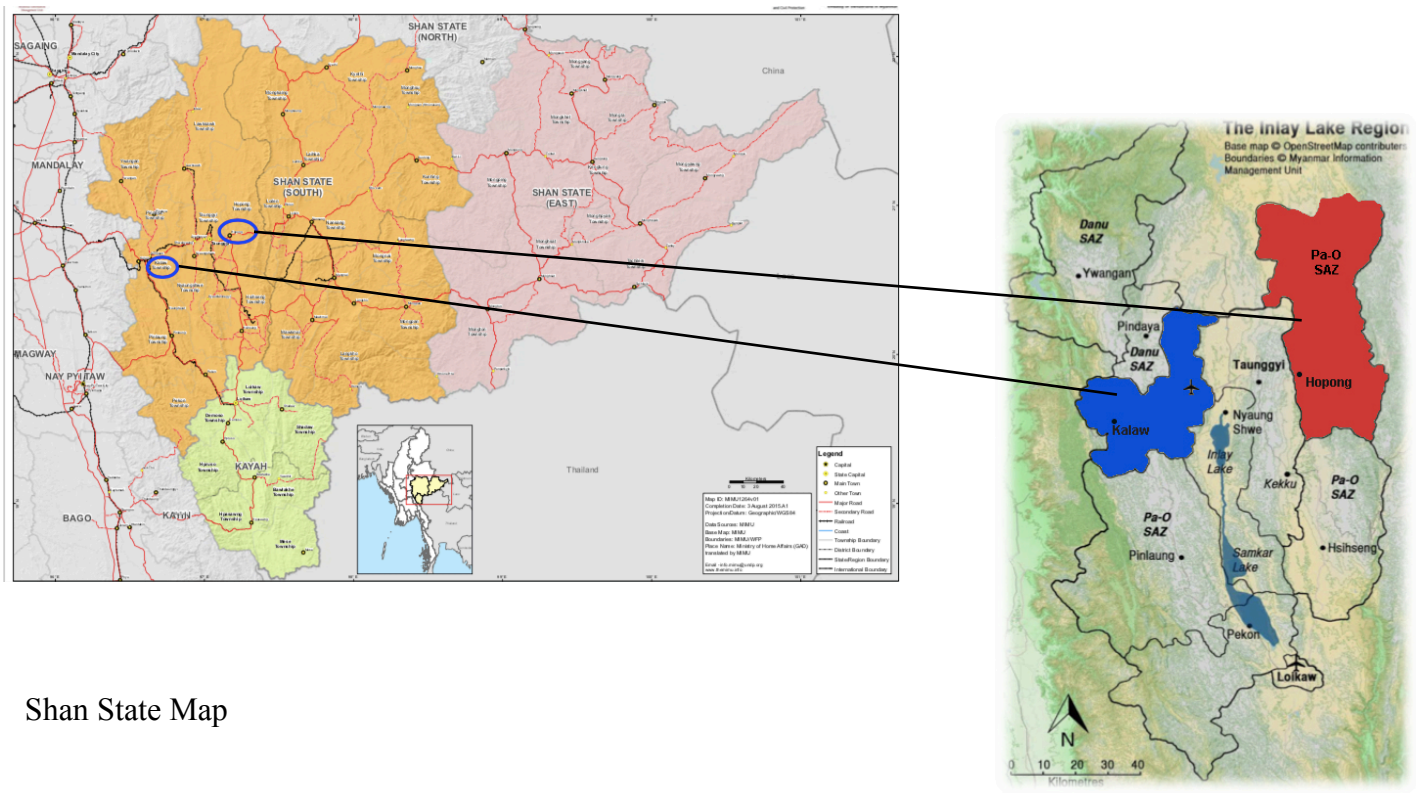
The most important social issues that are concerned by European buyers include 1) child labour, 2) health, and safe working conditions, 3) respecting labour laws, 4), paying minimum wage, and 5) correct use of pesticides (CBI, 2017).

2.2.11. Ginger production in Myanmar

Ginger is grown approximately over 4,987 hectares annually and the major production area is Southern Shan State where about 84 % contributes to national production along with its annual average production of 55,705 tons (ILO, 2017). Kalaw, and Hopong townships are the major ginger growing areas in Southern Shan State. In these areas, ginger is grown as a major cash crop by the smallholder farmers by rotation with upland rice and other crops (Winrock International, 2016).

Kalaw Township: Kalaw township is one of the top ginger producing areas in Myanmar with an annual production area of 917 hectares, yielding an average volume of 18,018 tons annually (ILO, 2017). The total area of Kalaw township is 582.13 square miles and is located at 4,315 feet above mean sea level. The maximum and minimum temperatures are 37.4ºC and 2 ºC with a total annual rainfall of 1,080 mm. In terms of population, it has 162,094 with 36,131 total households (Township Administration-Kalaw, 2017). The majority of soil in the area is Red Earth and Yellow Earth, typically being well-drained with fine to medium texture in surface soil, which is favourable for crop production (Aye, 2001).

Hopong Township: It is located in Taunggyi district in Southern Shan State of Myanmar and its elevation is at 3,541 feet above mean sea level. It has a temperate climate and its maximum and minimum temperatures are 39 ºC and 6 ºC respectively. The total area is 1220.56 square miles with a population of 102,360 in 2017. The main agricultural products are garlic, maize, ginger, pigeon pea, turmeric and sugarcane. Ginger is cultivated over 198 hectares with an annual production of 3,335 tons (Township Administration-Hopong, 2017).



Shan State Map

The Inle Lake Region

Figure 2-8: Map of Shan State Myanmar showing study area

Source: (MIMU, 2018)

The other ginger growing areas are Chin state, Mandalay and Ayeyarwaddy regions. The following Table shows the ginger production areas and annual harvested yield of Myanmar with a grand total of 66,085 tons (Htwe, 2017).

Table 2-2:Breakdown of ginger production in Myanmar by key producing areas

Region	Area Planted (hectare)	Volume (tons)	Average Yield (tons/hectare)	% Share to Volume
Chin	1,319	5,792	0.71	9%
Mandalay	285	2,655	1.52	4%
Southern Shan	3,143	55,705	2.89	84%
Ayeyarwaddy	238	1,933	1.32	3%
Total	**4,987**	**66,085**	**6.33**	**100%**

Source: : Ministry of Commerce, Ginger Research Study (Htwe, 2017)

2.2.12. Inputs used in Myanmar ginger production

The major inputs used for ginger cultivation in Myanmar are seed rhizomes, fertilizers and herbicides. Since the ginger crop is a heavy nutrient feeder, urea fertilizer and cow dung manure are the most extensively used inputs among the ginger farmers in Myanmar. Ginger farmers also use the herbicides because the cost for herbicides is cheaper and saves 30-40% more when compared to hand weeding in cost. The problem using inputs, particularly in Southern Shan State, is that most of the fertilizers sold by retailers are Chinese brands with Chinese instructions, making it difficult for the farmers and, even high literate people, to read. However, farmers are happy to apply the Chinese fertilizer due to its cheaper price than other brands (ILO, 2017). Ginger farmers in Southern Shan State of Myanmar apply more than 150 kg of nitrogen, 10-20 kg of phosphorous and potassium per hectare of land (Winrock International, 2016).

2.2.13. Ginger consumption in Myanmar

In Myanmar, ginger is consumed in different forms for culinary and medicinal purposes. It is used in curries, soups and to overwhelm the fishy smell. Ginger is also used for medicinal purposes because it is a good stimulant, expectorant, and valuable for dyspepsia and throat troubles (Myanmarnet, 2017). It is used to cure respiratory ailments, infected sores, and inflammation caused by the injury. In order to treat colds, runny noses, coughs, asthma and bronchitis, ginger rhizome is mixed with honey (DeFilipps & Krupnick, 2018). Another consumption form of ginger in Myanmar is ginger salad made from pickled ginger as a main ingredient and mixed with other ingredients such as chickpea powder and oil. The consumption of ginger salad is popular in many parts of Myanmar because people in Myanmar believe that it is good for the stomach due to the health benefits of ginger (Rainforest Cruises, 2017).

2.2.14. Ginger Export

Myanmar exported about 8,000 tons of fresh ginger in the 2008-2009 financial year, 9,200 tons in 2009-2010 and 9,900 tons in 2010-11, mainly to India and China (Kyaw, 2011). In addition to these markets, a number of exporters are preparing dried and sliced ginger for export markets in the EU, mainly Germany and the Netherlands. The importers in the EU

make value-added products and then re-export to other countries in the EU (Winrock International, 2016).

The following Figure illustrates ginger export by Myanmar to the world market from 2000 to 2016.

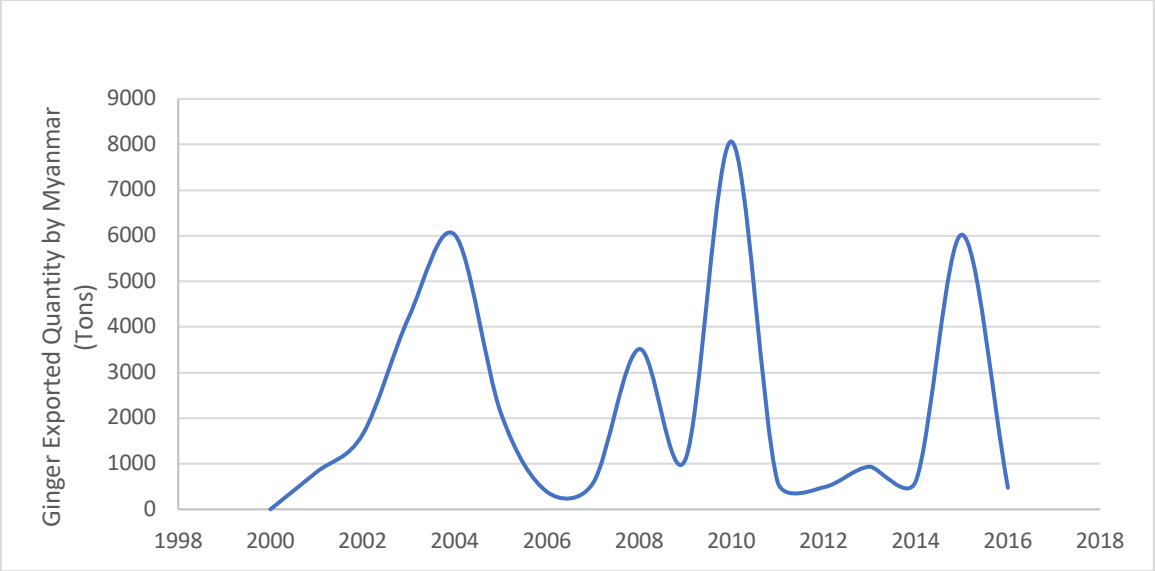


Figure 2-9: The export trend of Myanmar ginger from 2000 to 2016

Source: FAO STAT Crops and Livestock product

2.3. Current Export Markets of Myanmar ginger

Table 2-3: Volume of whole/sliced ginger exports from Myanmar (2012-2016)

Product: 091011 Ginger, neither crushed nor ground - comprised of fresh, dried, others

Importing	Volume (in tons)				
Countries	2012	2013	2014	2015	2016
Singapore					449
China	1,547	1	82		333
Sri-Lanka			49	26	181
Malaysia					134
Pakistan	2	806	4,155	187	91

India		110	319	189	82
Bangladesh				6,149	
Others	37	40	90	206	142
Total	**1,586**	**957**	**4,695**	**6,757**	**1,412**
Source: Trade Map - ITC; direct and mirror data; accessed 30 Sept 2017					

Table 2-4:. Volume of Whole/Sliced Ginger Exports from Myanmar (2012 – 2016)

Product: 091012 Ginger, crushed or ground (powder and others)

Importing	**Volume (in tons)**				
Countries	**2012**	**2013**	**2014**	**2015**	**2016**
Germany	39	51	64	140	239
Singapore					84
Malaysia					35
Japan					2
Thailand		8	48	12	
United States		13	5		
Others	2		19		5
Total	**41**	**72**	**136**	**153**	**365**
Source: Trade Map – ITC; direct and mirror data; accessed 30 Sept 2017					

According to Tables 2-3 and 2-4, export of ginger from Myanmar to China, India and Pakistan shows a decreasing trend, while export to Sri-Lanka and Germany shows an increasing trend. Myanmar commenced exporting to new countries such as Singapore, Malaysia and Japan in 2016 and, hence, it seems that Myanmar exporters have shifted into new potential markets.

2.3.1. Border trade

Owing to the proximity of Myanmar to India and China, Myanmar has a long border trade history with these countries. Myanmar have signed three border trade agreements with India, Thailand and Bangladesh, as well as one MOU with China and one protocol with Laos since 1996 (Naing, n.d.). Over the first 62 days of the fiscal year of 2018, Myanmar exported

commodities worth US$ 21.25 million to India, and the exported products included areca nuts, ginger, saffron, turmeric, bay leaves, and other fruits and vegetables (Khant, 2018). In 2013-14, four consignments of dried ginger were exported to India through Moreh border trade (Das, 2016). Another peculiar thing about the border trade between Myanmar and India is that ginger is one of the commodities identified for exchange by the residents who live along the border area of Myanmar and India. Moreover, ginger is one of the items approved by two governments for border trade effective from 1 April 2007 (Das, 2016).

Figure 2-10 shows the ginger trade by two channels, namely border trade and overseas trade. Border trade is collaborated with Bangladesh, India, Pakistan and China. Based on the interviews with traders conducted by ILO, the border trade channel consisted of mainly fresh ginger while overseas exports consisted of mainly dried ginger. It was also noted that price was the most important criteria at the border trade market while overseas markets are where buyers and governments demand compliance with certain social and environmental standards (ILO, 2017).

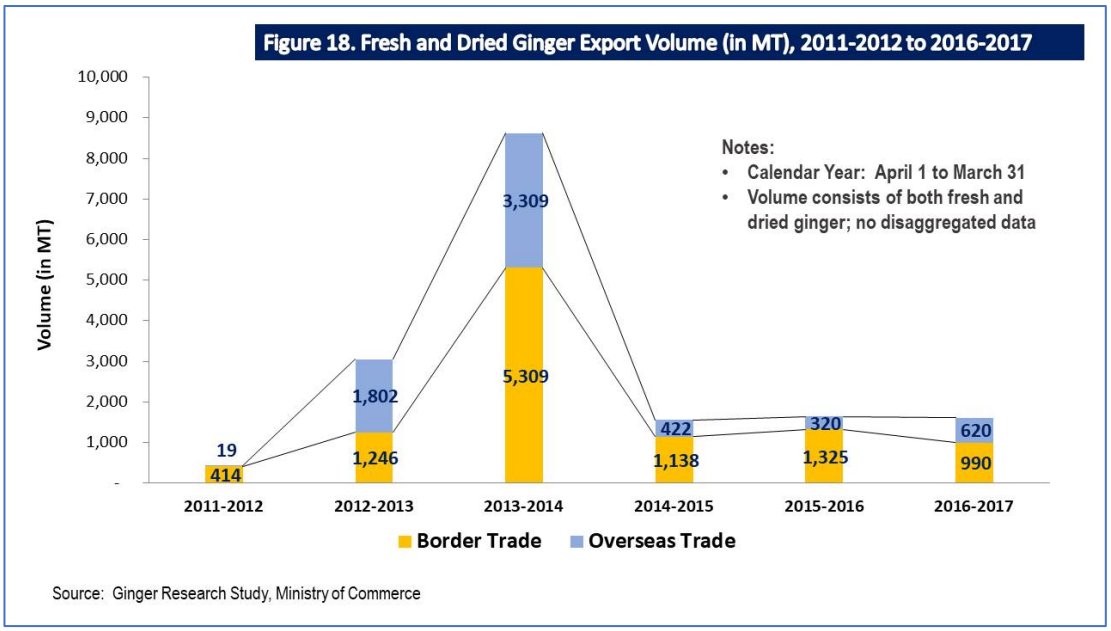


Figure 2-10: Ginger export by border trade and overseas trade

Source: Report on Occupational Safety and Health (OSH) Assessment in the Ginger Value Chain: Shan State-Myanmar (ILO, 2017).

Export of ginger through border trade is the most accessible channel for the exporters in Myanmar because quality requirements and documents works are not sophisticated and price is the only factor in the decision for purchasing (ILO, 2017).

Chapter 3 :Literature Review

3.1. Value Chain Approach

The value chain concept was first introduced by Michael Porter in 1985 and the chain, as its name implies, represents a linked set of value-added activities (Soosay *et al.*, 2012). It is described as a "full range of activities required to bring a product or service from conception, through the different phases of production, delivery to final consumers and final disposal after use" (Hellin & Meijer, 2006, p. 4). It shifts the focus from production alone to the whole range of activities, involving design and marketing, and also deals with the governance such as how chains are organized and managed (Lee *et al.*, 2012). Hence, the value chain can be defined as a series of activities of adding value throughout the chain from production to marketing in order to get the higher profit. In another way, it is a chain to demonstrate the vertical relationship between producers and buyers and the movement of a particular product from the producers to consumers (Meaton *et al.*, 2015).

It was realized that value chain approach can offer an important approach for engaging smallholder farmers individually or collectively to enter into high value export markets (Rich *et al.*, 2011). It shows the particular point of activities necessary to add or create value in a product or service and, thus, the value chain approach can offer competitive advantage for a business or firm (Ensign, 2001). The value chain approach is useful to examine the inter-relationships between ranges of diverse actors who are involved in all stages of marketing channel. In addition, it highlights the inequities in power relationships between the actors based on the governance of the supply chain (Kaplinsky, 2000). According to Trienekens (2011), the chain actors include inputs suppliers, producers, traders, processors, transporters, wholesalers, retailers and final consumers as well as the regulatory institutions who are not involved directly in the chain.

Value chain in agri-food sector is divided into four main stages: inputs, production, processing, and delivery to consumers as illustrated in Figure 3-1.

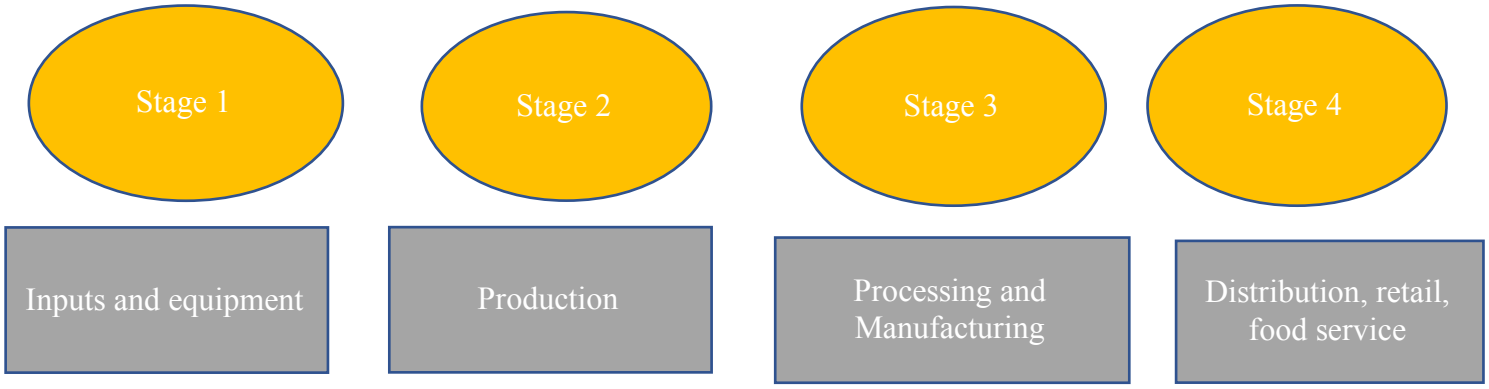


Figure 3-1: The four stages of the food and agribusiness value chain

Source: Value adding in the agri-food value chain (Cucagna & Goldsmith, 2018)

Stage 1 involves suppliers of agricultural products and services to farmers such as biotechnological, agro-chemical and fertilizer, animal health, animal breeding and farm equipment companies. Stage 2, production, involves every activity related to the production of raw materials such as crop and livestock products. Stage 3 is comprised of food processing and manufacturing such as beverage, breweries, wineries and packaged food companies, which converts raw materials into either branded or unbranded food products. The firms who are involved with food distribution, grocery retail and food service lie under the category of stage four (Cucagna & Goldsmith, 2018).

Kaplinsky and Morris (2001) stated that understanding the flow of a product from producers to consumers is made possible by mapping the value chain, which demonstrates the activities required for an existing product or service, from conception stage, then passing through different phases of production until delivery to the final consumers. Figure 3-2 shows the existing ginger value chain map in Southern Shan State of Myanmar that was conducted by Winrock International in 2016.

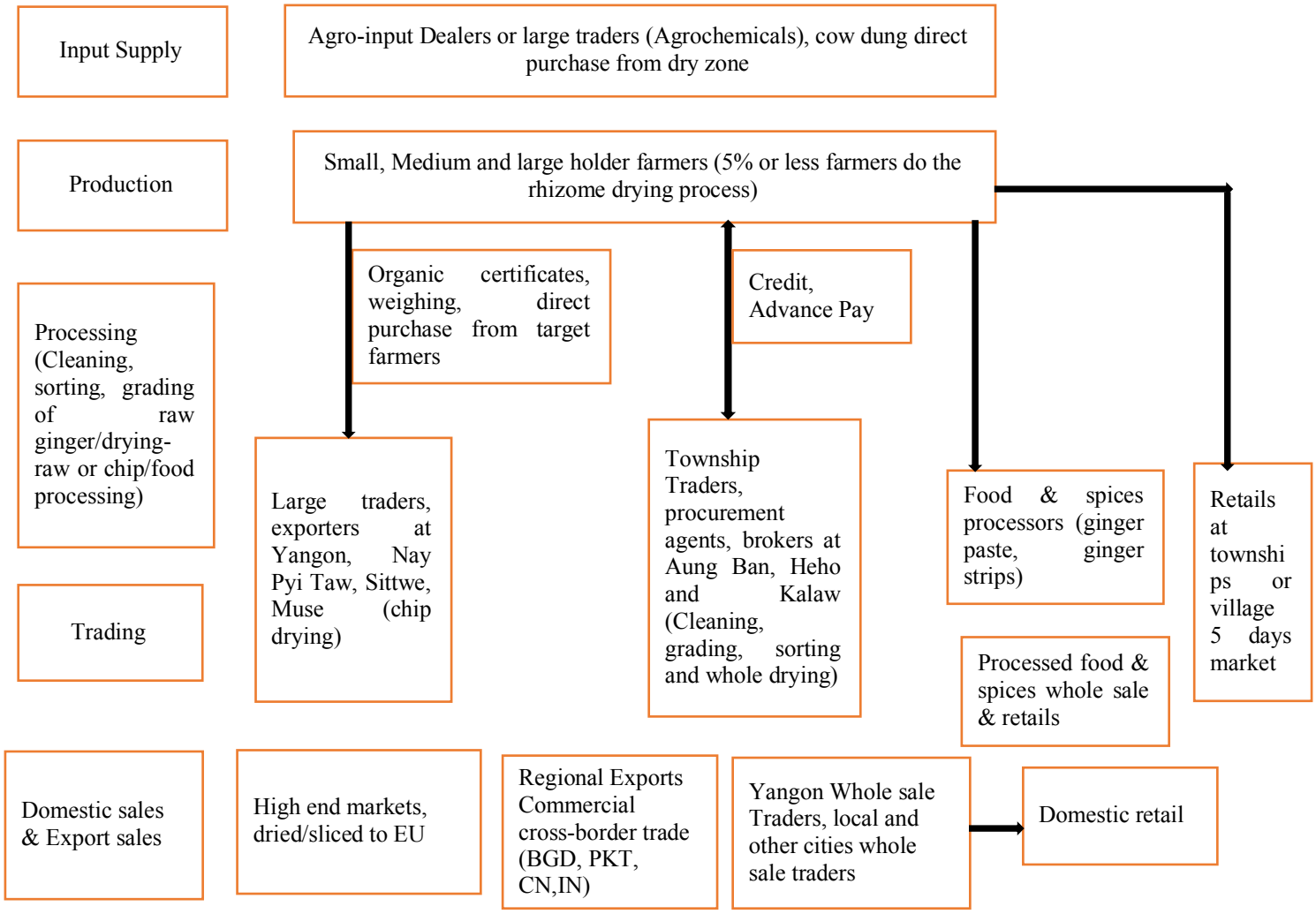


Figure 3-2: Ginger Value Chain Map in Southern Shan State of Myanmar

Source: Ginger Value Chain Assessment Summary (Winrock International, 2016)

As illustrated above (Figure 3-2), the ginger value chain in Myanmar is comprised of many actors: input suppliers, farmers, traders, exporters, processors, wholesalers and retailers. Farmers buy the inputs from agrochemical dealers or traders who have sold the inputs on credit with interest. The local traders in Southern Shan State sell the ginger to the traders in Mandalay and Yangon, which are commercial cities, and then it is either sold to domestic markets or exported to Bangladesh, Pakistan, China and India. In addition to these markets, there are high numbers of exporters who are preparing dried and sliced ginger for export markets in the EU, particularly Germany and the Netherlands (Winrock International, 2016).

Accordng to Trienekens (2011), after mapping the chain in the value chain framework, value chain constraints are analyzed and the opportunities are then redesigned. The last stage is to find the places for upgrading based on the constraints and opportunities identified. Therefore, the author proposes three key elements: network structure of horizontal and vertical relationships, value-added and governance structure, which covers organizational arrangements between value chain actors. The following figure illustrates the value chain analysis for developing countries by Trienekens (2011).

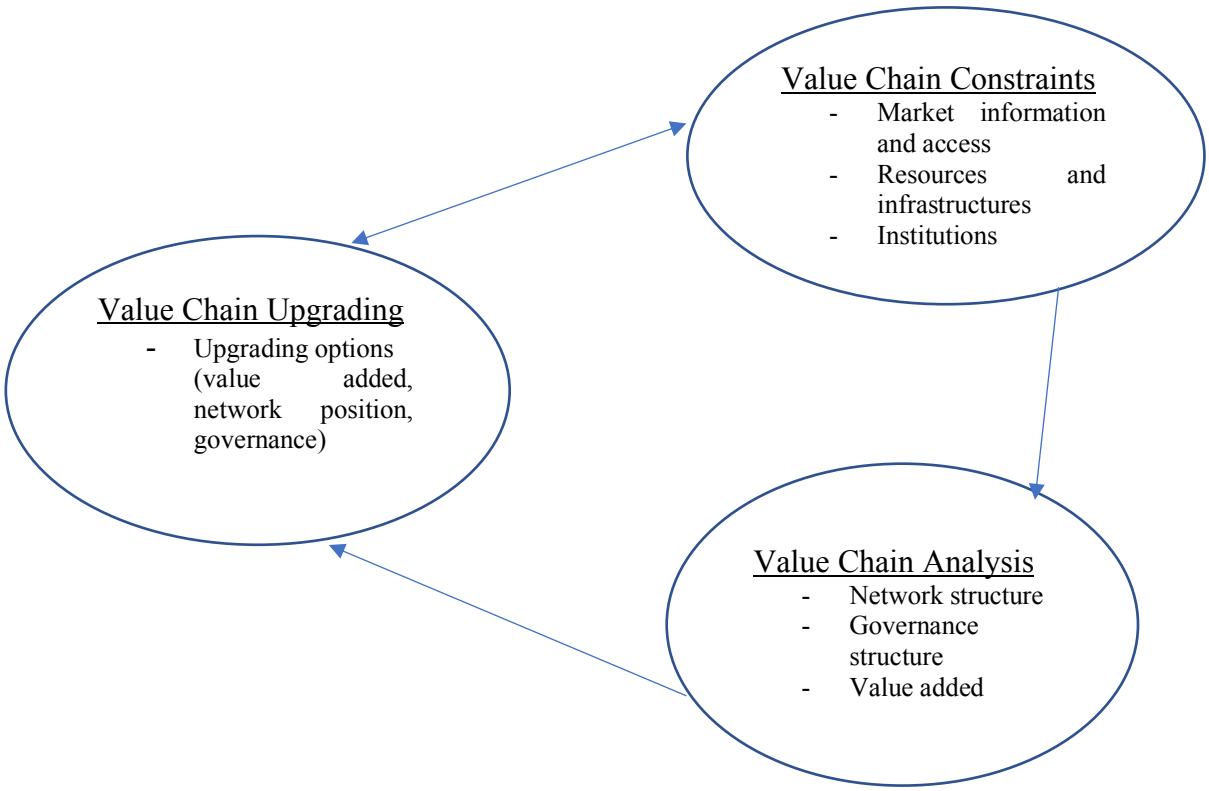


Figure 3-3: Value Chain Analysis Framework

Source: Agricultural Value Chains in Developing countries (Trienekens, 2011)

3.2. Constraints for value chain upgrading in developing countries

A constraint, or bottleneck, is any factor that limits or hinders any system or organization from realizing its set goals (Nyaoga & Magutu, 2016). According to Trienekens (2011), the common constraints for value chain development in developing countries are market access (local, regional, international), available resources and physical infrastructures and institutions void (regulative, cognitive and normative).

3.2.1. Market Access

Market access is one of the constraints for smallholder farmers who have a small farm and low productivity and, consequently, it is difficult to meet the requirements in terms of quality and consistency required by the market. As a result, many smallholders farmers wish to sell their products through traditional market channels instead of modern food retail and wholesale markets which offer higher prices (Maspaitella *et al.*, 2018). Having access to market information, along with the ability to translate it into market intelligence, is a key point for the producers to be able to participate successfully in value chain (Trienekens, 2011). The market constraints faced by value chain actors in developing countries also include difficulties in getting the market information and meeting the requirements demanded by the markets such as prices, quality and other measures like sanitary and phytosanitary. Jari and Fraser (2009) described that access to market information at farmer level is related to the ability of farmers. For example, lack of farmers' bargaining power with brokers and traders means that they get lower prices than they should be receiving.

In the case of exporters, the market and meeting the exporting requirements of host countries are essential for them in order to receive a good price and not be rejected by the authorities in these countries (Nyaoga & Magutu, 2016). During May 1999-April 2000, about 860 shipments from India were rejected by the United States of Food and Drug Administration (USFDA) due to the inability of smallholder farmers, who dominated the production system, to meet the food safety and quality requirements (Roy & Thorat, 2008). A study on Nepal spice chain also showed that many intermediaries along the spice chains were constrained by poor information flow and, consequently, the farmers are not aware of the prices offered and quality required by the exporters (Bhattarai *et al.*, 2015). In addition, non-trade barriers such as quota, excessive export documentation, and sanitary and phytosanitary measures make it difficult for the exporters to export their products (Ababa, 2017). Unstable price is one of the market constraints, making it difficult for the value chain actors to forecast their revenue (Issahaku, 2014).

3.2.2. Resources and Physical Infrastructure

Resources and physical infrastructure access such as specialized skills, access to technology, inputs, market, information, credit and external services enable or constraint the value chain upgrading of developing countries (Giuliani *et al.*, 2005). First of all, low level constraint is inadequate input materials at production and post-production level for value chain upgrading (Trienekens, 2011). Catfish value chain in Nigeria showed that traders and retailers faced product losses due to lack of proper storage facilities and insufficient water along with often leaving the fish in the sun for long periods (Webber & Labaste, 2010). The sweet potato value chain in Ghana result showed that lack of capacity to use cold chain facilities at storage stage by the farmers and traders caused high losses in quantity and quality of the products, affecting the economic return to the actors (Sugri *et al.*, 2017). In the case of ginger, if farmers or traders cannot store the ginger in a proper warehouse, fresh ginger may suffer from weight loss, shrinkage, sprouting and rotting during storage after three to four weeks of harvesting (Kaushal *et al.*, 2017).

Second level constraint is the geographic position of the value chain firms, meaning that if the firms are located far away from targeted markets, it has an impact on its competitive position in the market (Trienekens, 2011). Proximity to markets and clients may help the actors to improve the development of design capabilities and, consequently, support for product and process upgrading (Giuliani *et al.*, 2005). If farms are located far from the market, farmers may face poor road access to transport their products into markets, leading to increased losses due to delay in transportation, and spending a lot of their time in transportation. Similarly, wholesalers and retailers have to pay more in their marketing costs, leading to higher prices for consumers (Issahaku, 2014).

According to the catfish value chain study in Nigeria, approximately 10-15 percent of catfish value is lost during transportation (Webber & Labaste, 2010). Likewise, ginger farmers in Nepal mentioned that high labor cost for transport is one of their major problems due to their remote primary collection centers as well as the hilly location of the ginger farms (Devkota *et al.*, 2009). Additionally, inadequate transport facilities include poor road infrastructure, meaning that farmers receive limited services such as agriculture extension practices, which

can affect the production (Garcia & Lwin, 2015). It is also stated that smallholder farmers who are living away from urban areas and cities, with less reliable communication and transportation infrastructure, are less likely to be involved in value chain activities (Barrett *et al.*, 2012).

Thirdly, limited educated labor and knowledge at production, distribution and marketing stages are important constraints. The fourth level constraint is availability of technology in production and distribution activities in the chain (Trienekens, 2011). In Sierra Leone mango value chain, post-harvest loss contributes 30 % of total losses and is the highest throughout the chain and, consequently, only 5% of the production meet the quality criteria required by the export markets (Arinloye *et al.*, 2017). Likewise, sweet potato farmers in Ghana expressed that the most technical constraints were pests and disease problems, short shelf-life and declining soil fertility (Sugri *et al.*, 2017). A study on ginger production in Nigeria showed that Nigeria is the world's top ginger producing country in term of cultivation area, but its contribution to the world output is low because of traditional farmers who practise the rudimentary production techniques (NdaNmadu & Marcus, 2013). Similarly, bacterial wilt is a serious problem in Kerala, which is a north-east region and major ginger production area of India, and causes about 50 % or more losses of total ginger yield (B. Sharma, R. *et al.*, 2012). Hence, technical constraint is also a big challenge to promoting the value chain of agri-commodities, particularly in developing countries.

3.2.3. Institutional Voids

The third constraint in upgrading value chain in developing countries is institutional voids (Trienekens, 2011). There are three types of institutions: Regulative, normative and cognitive institutions. Regulative involves legislation, government regulations and policies that have to be followed by the firms, whereas normative institution deals with business practices, business policies and ethical standards. The cognitive institution involves identifying the roles of actors along the chain such as consumers or producers or policy makers or citizens (Scott 1995, cited by Trienekens, 2011). However, in developing countries the characteristics of insitution voids are defined as "situations where institutional arrangements that support markets are absent, weak or fail to accomplish the role expected from them" (Mair & Marti, 2009, p. 1). Hence, many developing countries that are living in poverty are not able to participate in markets due to their institutional voids (Mair & Marti, 2009).These institutions

could affect the value chains by setting up unnecessary trade barriers for production materials and technology as well as denying FDI for infrastructure development, along with posing unnecessary taxes by the government legislation, regulations and policies (Trienekens, 2011).

In addition, many studies reported that governments in many developing countries fail their role in creating and strengthening social institutions which are essentail for markets to exist and perform properly (Mair & Marti, 2009). Normative institutions, which deal with the business practices and policies, and ethical standards have big impacts on the value chain because they can limit the value-adding and profit orientation in the chains (Markelova *et al.*, 2009). In addition, poor cognitive institutions can limit the products or processes innovation as well as the free flow of information and knowledge, mobility of labor, and relationships between communities (Trienekens, 2011).

3.3. Value chain analysis (VCA)

Taylor (2005) mentioned that the primary objective of value chain analysis is to improve supply chain performance, while Akenbor and Okoye (2011) said that the main goal is to maximize the value creation along with minimizing the cost. Rich *et al.* (2011) stated that value chain analysis provides the ideas of how to incorporate the governance relationships between the actors in the value chain. In a broader concept, it is applied to focus on linkages and relationships both between and within actors at each stage of production as a guide for public policy (Rich *et al.*, 2011). It is a very useful tool, particularly for new producers, including poor producers and poor countries, who are trying to enter global markets in a way which would provide sustainable income growth (Kaplinsky & Morris, 2001). It has highlighted the increasing challenges that have been faced by farmers of developing countries who are involved in agribusiness (Humphrey & Memedovic, 2006b). Ensign (2001) noted that value chain analysis can be applied to create competitive strategies, understand the sources of competitive advantages and then examine and develop the linkages and interrelationships between the activities that create value.

According to Trienekens (2011), there are three components of value chain analysis, and these are network structure, value-added and governance structure. Value chain governance, which is one of the prominent features in value chain analysis, is also discussed in this section.

3.3.1. Network Structure

Network structure has two dimensions: vertical and horizontal. The vertical dimension shows the flow of products and services from producers to end-consumers, which is value chain or supply chain, whereas the horizontal dimension demonstrates the relationships between the actors in the same level (e.g between farmers, between traders etc.) (Trienekens, 2011). Lazzarini *et al.* (2001) demonstrate interrelationships between the vertical and horizontal dimensions in value chain as in Figure 3-4.

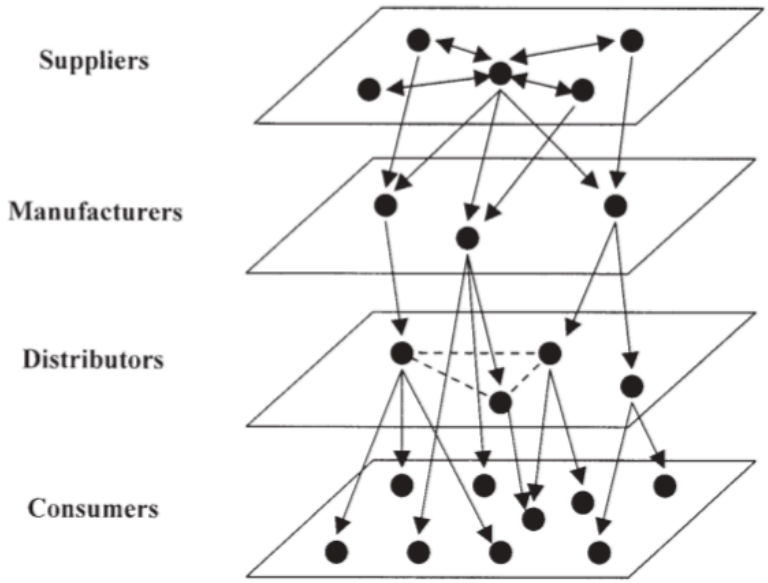


Figure 3-4: Example of a generic netchain
Source: Integrating supply chain and network analysis (Lazzarini *et al.*, 2001)

According to Figure 3-4, vertical relationships show all stages or may skip some links in the value chain (e.g relationship between manufacturers and distributors) while horizontal relationships between actors could be different shapes, such as farmer cooperatives or price agreement between traders (Lazzarini *et al.*, 2001). Horizontal coordination focuses on consolidation of actors who are located at the same level of the food chain and vertical coordination involves contracts and agreements along the different levels of the chains (Coltrain *et al.*, 2000).

Common forms of vertical integration in agribusiness are contractual arrangements in the poultry, swine, fruit and vegetables industries (King, 1992). On the other hand, the horizontal dimension is characterized by purchasing, production and delivery dependencies between parties that are located in the same value chain link such as collaborative agreement between small and medium size processors, sourcing or marketing cooperatives and so forth. Horizontal relationships, such as farmers' cooperatives or associations, increase the bargaining power of smallholder farmers and make lower transaction costs when purchasing from small farms in the case of retailers (Trienekens, 2011). Through effective horizontal integration of actors throughout the chains, actors could remain competitive in the chain (Frohlich & Westbrook, 2001).

3.3.2. Value-adding

Value-adding is defined as "economically add value to a product by changing its current place, time and form characteristics to characteristics more preferred in the marketplace" (Coltrain *et al.*, 2000, p. 5). Alternatively, it refers to the collection of activities within a company or industry resulting in the creation of a product or service valued by the consumers (Katz & Boland, 2000, p. 717). It is aimed at specific markets, comprised of a number of actors and deals with quality, costs, delivery times, delivery flexibility and innovativeness. It can be achieved through innovation and coordination. One way to add value for food firms is labelling the products according to intrinsic and extrinsic product attributes which are quality characteristics. Intrinsic characteristics are measured based on product color, taste, tenderness, while extrinsic characteristics deal with processing such as organic or fair-trade production (Trienekens *et al.*, 2012). For example, in fresh-produce value chains such as the vegetable value chain, value can be added through reliability of delivery, speed of delivery and production innovation (Humphrey & Memedovic, 2006b).

In the agri-food industry, understanding the consumer value is important for value-adding, which focuses on safety and quality of the products (Gao *et al.*, 2011). For perishable products such as fruits and vegetables, today, consumers value, not only core product attributes, but also other attributes such as food safety, ethical production, provenance and other features related to marketing along the whole value chain (Wognum *et al.*, 2011). For example, Global-GAP, Safe Quality Food (SQF) are now applied by many importers around the world. A Food Value Chain Analysis (FVCA) case study which was carried out in the UK

in 2006 to identify the misalignments between customer needs and supply chain activities, showed that the business that offers a less value-added product could not compete with others that offer a similar product with superior value to the end-consumers (Zokaei & Simons, 2006).

3.3.3. Governance structure

Governance structure is defined as " the way in which a transaction is organized within the rules and regulations as defined by the institutional environment" (Jordaan *et al.*, 2014, p. 14). Williamson (1985) stated that there are three kinds of governance structure, namely purely spot market, vertical integration and a combination of these two forms. An empirical study on governance structure choices in China's pork supply chain showed that governance structure in the study is determined by two factors. The first one is transaction cost which influences slaughtering and processing industries in governance mode, while collaborative advantage, the second factor, plays a major role in choosing governance structure. In this case, large scale slaughtering and processing industries choose to transact with small-scale pig producers as well as having stable relationships, by which transaction costs can be reduced. On the other hand, they collaborated to improve mutual advantages in terms of logistics, cash response, quality management and technological renovation, but mostly focused on quality management and logistics (Ji *et al.*, 2012).

3.3.4. Value chain governance

In value chain analysis, one of the prominent features is to focus on governance, emphasizing both power relations of actors in the chain and the institutions which influence and use the power they hold. It can be defined as non-market coordination of economic activity and is a central concept to value chain analysis (Gereffi *et al.*, 2001). The governance plays a critical role in value chain because it analyses the power distribution between the value chain actors. These actors take the responsibilities for division of labour within and between the firms as well as the capacity-building for particular participants in the chain in order to upgrade their activities (Kaplinsky, 2000). In brief, "coordination through direct exchanges of information between the firms is referred to as value chain governance" (Humphrey & Memedovic, 2006b, p. 8).

In value chain analysis, governance, which includes the relationships among the actors, could be institutions, rules, policies, customs, a set of processes that affect the direction, management and control of a supply chain (Simatupang *et al.*, 2017). The value chain governance patterns depend on the interactions between how value chain actors manage and how they apply the technologies for design, production and the governance of the value chain itself (Gereffi *et al.*, 2005). Therefore, the analysis of governance relations in the value chains helps to identify the major institutional actors which, in turn provides insights into policy levers which might have influence on the behavior of key stakeholders in the chain (Kaplinsky, 2000).

According to a study on governance of market-oriented fresh food export value chains from New Zealand in 2017, leadership plays an important characteristic of value chain governance due to its contribution to market orientation (Trienekens *et al.*, 2018). Therefore, the authors advised that the actors who are taking a leadership role should have the ability to oversee the whole value chain and connect the actors in the chain.

3.3.5. Leadership

Kaiser and Overfield (2010) stated that the primary concern of leadership is the performance of the collective for which the leader is responsible. It is also concerned with influencing individuals to move from their short-term self-interest into the long-term performance of the group. The authors also added the point that leadership in the value chain begins with considering the things that make individual leaders unique, such as their personalities, abilities, knowledge, skills and relationships (Kaiser & Overfield, 2010). It is an evolved solution to adapt to the problems collectively (Van Vugt *et al.*, 2008).

Good leadership can contribute to credible governance, which is clearly able to link value chain performance to market rewards (Webber & Labaste, 2010). Research on farmers' producer companies in India have shown that the quality of leadership such as the integrity, the quality and its acceptance within the community, along with the market environment, are essential factors for a successful producer company (Trebbin & Hassler, 2012). Leadership is important, particularly in global value chains in which the export products need to meet the market requirements and standards demanded by the market. In early 2000s, Thailand vegetable exports to the EU dropped by 20 percent due to Europe-GAP certification and

traceability requirements. In that case, exporters took the leadership role and identified the market requirements by working with a local university, Kasetsart University. As a result, the growers then received a 50 percent increase in prices for the certified products in the EU markets (Webber & Labaste, 2010).

3.4. Value chain upgrading

Trienekens (2011) claims that the value chain can be described as a vehicle by which new forms of production, technologies, logistics, labor processes and organizational relations and networks are introduced. Hence, upgrading of the value chain means upgrading of the vehicle in order to perform those activities effectively. Therefore, upgrading plays an essential role, but not an optional extra one, because it is a requirement in order to get continued access to the rapidly changing global market (Humphrey & Memedovic, 2006b). It is defined "as innovating to increase value-added" (Giuliani *et al.*, 2005, p. 4). It is achieved as a result of mobilization of economic, social, institutional and geographic resources or capabilities at local, regional and national levels (Murphy, 2007). The concept of value chain upgrading provides a bridge, making a link between the institutions and governance dimensions of the value chain approach (Gereffi *et al.*, 2001).

Based on value chain analysis framework developed by Trienekens (2011), value chain upgrading is grouped as follows.

- Upgrading of value-added production: process upgrading, product upgrading, functional and intersectoral or chain upgrading
- Value chain-network upgrading: upgrading for the right market and being part of the right market channel
- Upgrading of governance: Upgrading the chain by public support to local joint actions for high price markets

3.4.1. Process upgrading (To make products more efficiently)

Process upgrading refers to transforming the inputs into outputs to be more efficient through better technology or modifying the production system (Gereffi *et al.*, 2001). In the agri-food sector, practicing Global-GAP which promotes production standards and storage of agricultural products, is a type of process upgrading. GAP deals with the usage of pesticides,

maintenance of water quality, sanitation, post-harvesting handling and transportation, aiming for sustainable agriculture practices as well as contribution to food safety and security (FAO, 2003). In the South Indian tea and coffee sector, two areas are upgraded: firstly, cultivation and processing by which improvement is made in Research and Development (R&D), extension services and strategic investments which, in turn, improve the competitiveness. Secondly, the area of marketing and exchange by which improvement in transparency and reduction of transaction costs within the sector could be made (Neilson & Pritchard, 2009).

3.4.2. Product Upgrading (To make better products)

This is a kind of upgrading to improve the quality of product so that producers get enhanced marketability and premium prices (Neilson & Pritchard, 2009). It is always related to demand in a market and could be related to intrinsic and extrinsic product features (Trienekens, 2011). It could also be introducing new products or upgrading the existing products faster than its competitors (Kaplinsky & Morris, 2001). It is essential for the producers to retain their market access through product upgrading because product quality and safety are major features for both domestic and international markets in the agri-food industry (Neilson & Pritchard, 2009).

A study on the mango value chain in Pakistan showed that consumers buy the mango based on both intrinsic and extrinsic quality. In the study, three groups were divided: mango lovers, value seekers and safety conscious. Among them, value seekers, the largest group, are willing to pay a higher price if they are offered the desired value (Badar *et al.*, 2015). From this research, it can be interpreted that product upgrading is essential to get higher price with higher demand. In addition to the domestic market, product upgrading is also a necessary condition for the exporters in developing countries who have comparative advantage in the agri-food sector. It is reported that there is a strong positive relationship between quality grading and the EU voluntary standards (Curzi *et al.*, 2014). Hence, product upgrading could also be achieved by following the standards of imported countries.

3.4.3. Functional upgrading (To move into more skilled activities)

It is a way of upgrading the function of value chain actors by altering their positions within the chains (Neilson & Pritchard, 2009). Kaplinsky and Morris (2001) believe that value can be increased by changing the activities conducted within the firm or business or moving the

central part of activities into different links in the chain. In many developing countries, functional upgrading is rarely done at an upstream level (Neilson & Pritchard, 2009). Since food market demand has become more heterogeneous and dynamic, more market-oriented activities are required at various stages throughout the chain, from producers to retailers (Trienekens *et al.*, 2012).

3.4.4. Intersectoral or chain upgrading (To move into new sectors)

Intersectoral or chain upgrading refers moving into a new value chain. For example, coffee and tea production is shifted into adoption of generic plantation management skills in allied plantation commodities such as rubber (Neilson & Pritchard, 2009).

3.4.5. Upgrading of value chain-network structure

It includes upgrading of horizontal as well as vertical relationships in order to focus on the right market channel. At the horizontal level, joint purchasing of inputs, collective action, farmer associations or groups are ways of upgrading the network structure (Trienekens, 2011). In many developing countries, upgrading of the value chain-network structure at a horizontal level is done by creating producers' associations or cooperatives (Roy & Thorat, 2008). Through these associations, farmers can achieve higher bargaining powers with, or displace middle agents entirely.

According to a case study of smallholder vegetable farmers in Indonesia, smallholder farmers have more choices for market channels if they are involved in a cooperative or farmer group or association (Maspaitella *et al.*, 2018). These organizations could provide the ways for farmers to overcome the market failures and maintain their positions in the market (Markelova *et al.*, 2009). They can help the farmers, not only for knowledge and information-sharing, but also for strengthening of market position with the buyers (Maspaitella *et al.*, 2018). Without upgrading, the chain network could delay the chain development. For example, Ghana pineapple value chain was constrained by the limited collaboration between exporters along with the weak national and international infrastructure (Trienekens & Willems, 2007). Sexton and Iskow (1988) reported that farmers in developed countries such as the USA, France, Germany, Japan and the Netherlands can address the production and markets' failure jointly through vertical integration into the market chain.

3.4.6. Relationship of actors in value chain

In the global value chain, the relationship between actors, particularly exporters and importers, is crucial, because information regarding consumer preferences and product specifications is now created by the close relationship between suppliers and buyers. Dolan and Humphrey (2000) advise that improving local relationship which highlights the relationships among local enterprises, and the relationships between enterprises and support institutions has become an importance aspect in business. According to Schmitz (2005), the relationships between lead firms and local producers can be analyzed by using value chain analysis by which constraints and opportunities can be explored.

According to Nahapiet and Ghoshal (1998), the relationship that develops between parties or actors is known as the relational dimension and the key factor that influences that dimension is referred to as trust. The authors also added that the strength of the relationship is an important factor within the relationship dimension. This is influenced by factors such as frequency, emotional intensity, intimacy, and reciprocal services (Granovetter, 1985). A study on external relationships and entrepreneurial orientation of tea manufacturing firms in Sri-Lanka showed that good relationships with actors such as tea brokers, government facilitating institutions, and educational and research institutions provide a positive contribution to entrepreneurial orientation of the firm (Wickramaratne *et al.*, 2017).

Furthermore, with the increased requirement of relevant certification standards such as Global-GAP, organic, Fairtrade and other contract relationships between exporters and smallholders, the relationship between the actors has become an important factor to increase income and welfare effects for the actors. Study on the relevance of business practices in linking smallholders and large agri-businesses in Sub-Sahara Africa found that the quality of the relationship between farmers and agri-businesses, particularly that received by farmers, is significantly higher when there is an agreement or contract between the farmers and the businesses such as a certification process (Kleemann, 2016).

3.4.7. Upgrading of governance

It was found that upgrading of governance such as public support to local joint actions, research centers, universities and international cooperation could create positive upgrading of process and products**.** In the case of smallholders' produce for exporting, only public-private partnership can upgrade the facilities, skills and production techniques of farmers (Giuliani *et al.*, 2005). A good example is African green bean exports in Kenya and Zambia where input supply, quality and usage, as well as the technical advice, are closely monitored by the exporters. The type, dosage and timing of pesticide use are also supervised by the exporters in order to meet the requirements by the export markets. The food safety standard for export was jointly developed by the Government and exporters based on the requirements of the export markets. Hence, smallholder farmers in these countries were able to export their products to the international markets as a result of collaboration with government institutions, donors and private companies (Okello *et al.*, 2007).

Analysis of innovation and governance in the case of Ghanaian pineapples and South Africa grapes determined that having long-term relationships between participating actors such as farmers and exporters created strong governance structures. As a result, the actors in both chains focused on infrastructure and product-related improvements such as Western standards like Europe-GAP and, consequently, producers have better access to market information and quality systems at the end markets (Trienekens & Willems, 2007). Unlike in that particular case, farmers in the spice sector in Ethiopia faced poor agronomic practices due to inadequate skills training, and a lack of improved inputs and technologies because of limited support from government institutions (Farm Africa, 2013).

3.4.8. Power

Power is a key component in value chain governance (Kaplinsky, 2000). In addition, power asymmetry between buyers and suppliers is a traditional requirement in supplier compliance (Locke *et al.*, 2009). An important challenge for a large number of small and medium enterprises (SMEs) in developing countries is how to enter into global markets and become competitive because asymmetric power relationships among the actors has an impact on the distribution of costs and benefits in the chain (Ouma *et al.*, 2017). In addition, power plays a critical role in the choice of vertical integration in the chain (Ito & Zylbersztajn, 2018).

Power is required for a balanced and symmetrical argument in market relationships (Granovetter, 1985).

Dolan and Humphrey (2000) reported that value chain governance may provide some facts to the stakeholders that inequities in power relationships and highlight the potential areas for points of entry particularly for smallholders. If power is unbalanced between the actors, it leads into asymmetrical relationships where dominant actors or suppliers must develop the relationships in order to improve their interaction with current customers and the potential to create new relationships (Johnsen & Ford, 2002). Additionally, greater dependence causes greater vulnerability. For example, farmers have to rely on traders for access to markets and capital. That dependence has become greater when the outcomes from the relationship of actors are better when compared to other alternative relationships (Johnson & Hofman, 2004).

Recent work on power has shown that it is essential to consider, not only power asymmetries, but also power symmetries such as jointly dependent relationships (Caniëls & Roeleveld, 2009). Pletrobelli and Rabellotti (2008) point out that geographical distance has a noticeable effect on the role of power in term of symmetries or asymmetries.

3.4.9. Trust

Wilson (2000) described the trust as the cohesion in agricultural transactions, which create the value of relationships between actors. Alternatively, it is described as mutual confidence that participating actors will not exploit the vulnerability of others (Sabel, 1993). It is often defined as "the dependability, confidence in actions and motives, and faith associated with an individual" (Newman & Briggeman, 2016, p. 2). Uzzi (1997, p. 43) stated that "trust is the distinguishing characteristic of a personal relationship". It is mentioned that trust can be created through a process of exchanges, through personal identification with other actors or through an organization established in order to minimize the vulnerability in the exchange process. It is a time-dependent asset which evolves over time and can be transferable to other relationships through reputation because it has value (Wilson, 2000). The meat value chain in Europe showed that trust levels are high overall, but they are generally higher at the downstream level (Fritz & Fischer, 2007).

Research on “Farmers’ Perception of Building Trust” with sales representatives of agrochemical materials in the US showed that not lying or exaggerating was the best way to demonstrate credibility in building trust with the farmers. The research also suggests that the representatives should focus on capacity-building of themselves, both professionally and personally. In order to do so, the sale representatives should improve and work constantly on their communication skills (Newman & Briggeman, 2016). Wilson (2000) also suggested that trust can be enhanced through information sharing and continuous interaction between participating parties. According to a survey of 14 customers firms and 48 suppliers in kitchen furniture and mining machinery in Germany, Britain and Italy, business managers reported that trust has become an important business tool because of a decline in trust in the business environment. A business relationship which is built on trust can reduce or improve its economic performance (Wilson, 2000).

3.4.10. Chapter Summary

The first part of this chapter describes the value chain concept and mapping of the existing ginger value chain in the study area. After that, the value chain framework is described in three parts: value chain constraints, value chain analysis and value chain upgrading. In the value chain constraints section, the constraints faced by many developing countries such as market access, resources and physical infrastructure and institutional voids are discussed in detail along with empirical results from many countries. Under the value chain analysis section, its three components, network structure such as vertical and horizontal, value-adding and governance structure have been discussed in detail. Value chain governance is also discussed in the same section. The final part of this chapter is value chain upgrading. Based on the value chain analysis framework by Trienekens (2011), upgrading is categorized into three groups: upgrading of value-added options, upgrading of value chain-network structure and upgrading of governance.

Therefore, the following research conceptual framework is developed, as illustrated in figure 3-5:

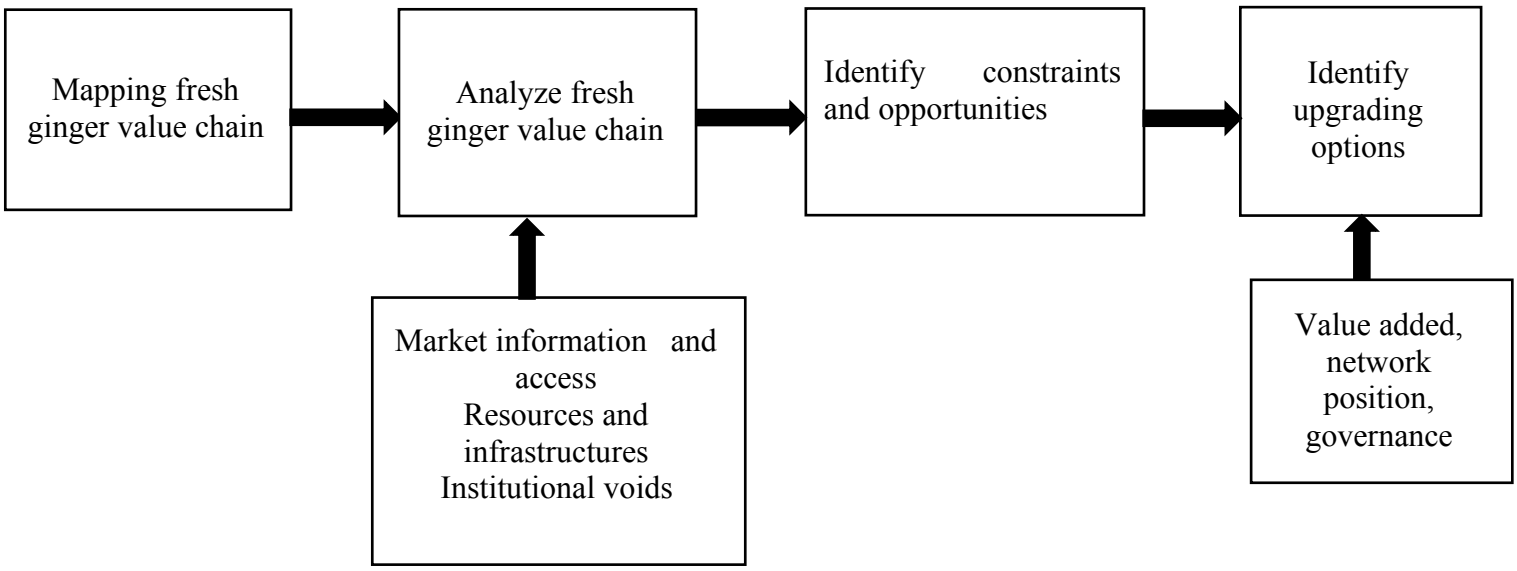


Figure 3-5: Conceptual Framework for research

Chapter 4 : Methodology

4.1. Research Method

Two types of research methods, namely quantitative and qualitative, are widely used to collect data (Kumar, 2011). The quantitative method is associated with a deductive approach that tests a theory, often dealing with a number or facts, whereas the qualitative method is likely to be related to an inductive approach to generate a theory, allowing the existence of multiple subjective perspectives and constructing knowledge rather than seeking to "find" it in "reality". However, in current business and management research, a mixture of these methods are likely to be used to look for the facts by the use and manipulation of numbers, as well as looking for the perceptions involved in these "facts" (Greener, 2008).

Rowley (2002) described that a research design is the logic that links the data to be collected and the conclusions to be made from the research questions and method. The author added that a research design has the following components:

- The study's questions
- The study's propositions
- The study's units of analysis
- The logic linking the data to the propositions
- The criteria for interpreting findings

The case study on "Seed input chains in La Frailesca, Chiapas in Mexico" in 2002 showed that qualitative value chain analysis enabled the researcher to gain a deeper and greater understanding of the different actors in the input (seed) chains and output (grain) (Hellin & Meijer, 2006). Another similar research on explanatory value chain analysis of Burmese pickled tea, conducted in 2016, used the qualitative approach in order to map the value chain which involves collecting information on the process of material flows, information flows, and the relationships of participants within and between the chain, from producers to final consumers (Thar, 2016). Similarly, a study on mapping the value chain of imported shellfish in China applied qualitative approach to recognize the activities of chain members and requirements related to imported shellfish (Wang *et al.*, 2019). Marc (2014) also applied a qualitative approach to identify and distinguish different value chain types for his doctoral

study on “Governance modes, collective organization and external facilitators in vegetable value chains in Northern Tanzania”.

After considering the above value chain studies, qualitative approach was applied to map the current fresh ginger value chains, analyse the chain and then identify its constraints and opportunities, along with identifying upgrading options for the current Myanmar ginger value chain study. This method enabled the researcher to closely engage with the ginger value chain actors and gain a deeper understanding of the existing ginger value chains. Payne and WIlliams (2005) described that the qualitative method typically provides the researcher with an explanation of what actually happened rather than a generalization.

4.2. Research sampling

Sampling is a critical component in qualitative research design because it avoids the research from over-representing or under-representing (Harrell & Bradley, 2009). Robinson (2014) explains that sampling or study population is the totality of persons which cases may legitimately be sampled in an interview study. The author added that sampling also provides an important theoretical role in the data analysis and interpretation process (Devers & Frankel, 2000). According to Bricki and Green (2007), many research projects that applied qualitative approach used purposive sampling because the participants selected were likely to generate useful information for the research. In this research, purposive sampling, which is also called judgmental sampling, was used because it enabled the researcher to use special knowledge or expertise about a group to select representatives of that population (Berg, 2001). It is a type of non-probability sampling which can provide reliable and robust data and may be used in both qualitative and quantitative research methods (Tongco, 2007). It is especially useful for research where the preliminary studies are carried out in order to test whether the proposed study is appropriate for the research question (Poggie, 1972 cited by Tongco, 2007).

In the current research, face-to-face interviews by using semi-structured questionnaires were conducted with 15 farmers from two townships (Kalaw and Hopong) to obtain information on ginger production practices, post-harvest management, market access and relationships with other actors in the chain, along with the constraints and opportunities experienced by the farmers. Ten farmers from Kalaw township, which is the biggest ginger production area in

Southern Shan State, and five ginger farmers from Hopong township, were selected for interviewed.

Table 4-1:Number and size of farmers whom interviewed

Number of farmers interviewed	15		
Study area	Kalaw Township	Hopong Township	Total
Large holder farmers	3	1	4
Medium farmers	4	2	6
Smallholder farmers	3	2	5
Total	10	5	15

Since the study is entitled "Upgrading options for Myanmar Fresh Ginger Value Chains", the role of retailers, wholesalers, agents, and traders along the chain play a critical role. Two ginger traders and one agent were interviewed at Aungban in Kalaw township, which is a commercial city in Southern Shan State of Myanmar where most of the vegetables produced in Southern Shan are traded across the country. One trader from Hopong township was also interviewed. Additionally, two wholesalers, two retailers and three exporters who are based in Yangon, a commercial city in Myanmar, were also interviewed. Face-to-face interviews with the processors who are based in Yangon were carried out in order to learn about the differences between fresh ginger and processed ginger value chains. Two ginger processors-cum-exporters who have an agreement with the farmers to grow organic ginger and buy from them, were also interviewed. A local ginger processor who makes ginger stripes and sells them back to the shops that make pickled ginger, was also interviewed in order to learn the local demand for processed ginger. Questionnaires were mailed to two importers in the United States of America who have been importing fresh ginger from Myanmar. A certification body that provides the certificate, including Global-GAP and organic certificates in Myanmar, was also interviewed in order to understand and be aware of the process.

With regard to participant selection, the farmers were selected for interview with the help of Winrock International as the organization has been working on the ginger sector in the study area since 2016. The list of fresh ginger exporters in Myanmar were received from the plant

quarantine section of Plant Protection Division under the Department of Agriculture in Yangon. The rest of the actors including an agent, traders, wholesalers and retailers were selected for interview based on the information received from the exporters. One staff member from the Department of Agriculture from each township in the study area, and the NGO person who has been involved in ginger activities in the study area, were selected for interview.

4.3. Data collection method

Data were widely collected from two sources, namely primary and secondary sources. Primary data was collected through interviewing and sending questionnaires, while secondary data was collected from documents such as Myanmar Government publications, NGO publications, previous research and personal records (Kumar, 2015). The following data collection method (Figure 4-1) was adopted to apply in this study.

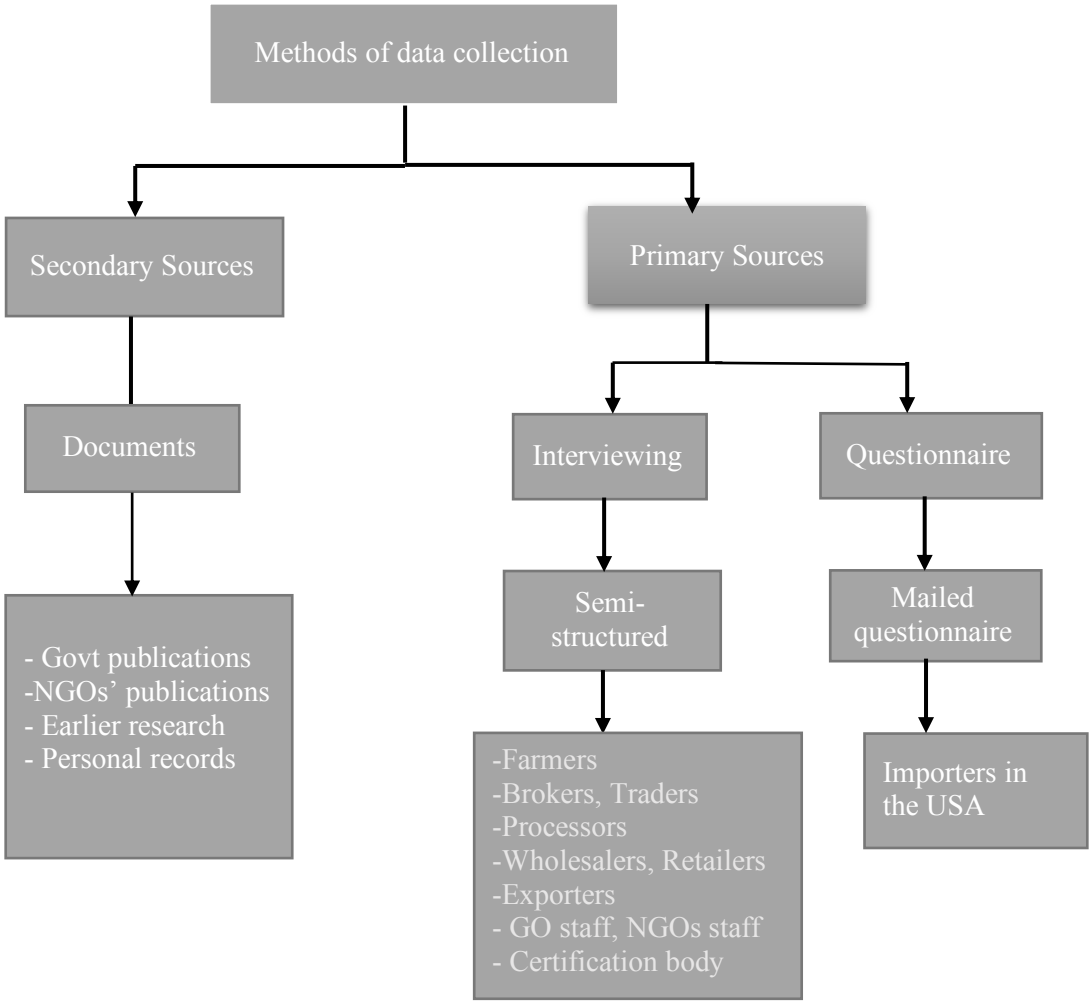


Figure 4-1: Data collection method applied for the study

4.3.1. Semi-structure interview

Semi-structured interviews consist of many key questions that help the interviewer to define the areas that need to be explored and also allow the interviewer or interviewees to pursue an idea or response in more detail, which has not been involved in the questionnaires. In addition, the qualitative method, such as the interview, provides a "deeper" understanding of social phenomena than a purely quantitative method (Gill *et al.*, 2008). In this interview type, there are a number of predetermined questions made up of open-ended questions, and special topics, but the interviewers are allowed freedom to digress, which means the interviewers can go far beyond the answers of prepared standardized questions (Berg, 2009). Ahmad (2017) used a semi-structured interview to collect data on his research on collective action of smallholder rice farmers' value chain in Yogyakarta, Indonesia. Similarly, Thai (2018) used the semi-structured interview approach to collect the primary data from pig producers for his Master's thesis on agri-food system transformation in Cambodia. Hence, a semi-structured interview approach was applied in this study.

4.3.2. Mailed questionnaires

This method is very popular in various economic and business survey methods (Kothari, 2004). Questionnaires were prepared very carefully in order to be effective in collecting the relevant information. The questionnaires were then mailed to the respondents who were expected to read and understand the questions. After that, the respondents answered the questions on their own, either by typing or writing down in the space left for respective answers (Kothari, 2004).

4.3.3. Document collection

Secondary data, such as ginger production area, ginger yield, and varieties, were collected from government officials and NGOs through a document collection approach. The sources of secondary data involved the Department of Agriculture (DOA) at township level in the study area and at national level, and NGOs that are supporting ginger activities such as technical support and marketing services in Myanmar. The secondary data from DOA involved the ginger production area, varieties, characteristics, average yield and production volume. The documents collected from NGOs involved a ginger value chain assessment

report, Occupational Safety and Health (OSH) assessment in the ginger value chain report, value chain selection in the food and agricultural sector in Myanmar, and a case study of drivers and constraints for occupational safety and health improvement in the ginger global value chain from Myanmar.

4.4. Data Analysis

Dey (1993) stated that analysis is the breaking down of the data into bits, and then "beating" the bits together. One view of data analysis is that the researcher moves from telling a story about a specific situation to constructing a map of key elements and variables within the story and then moves into building a theory or model (Gray, n.d). In the current study, Qualitative Data Analysis (QDA) was applied to analyse the data collected from different actors along the ginger value chain, from producers to importers in overseas to achieve the objectives and to answer the research question. Dey (1993) described the qualitative data analysis in a circular way as shown in the following diagram (Figure 4-2).

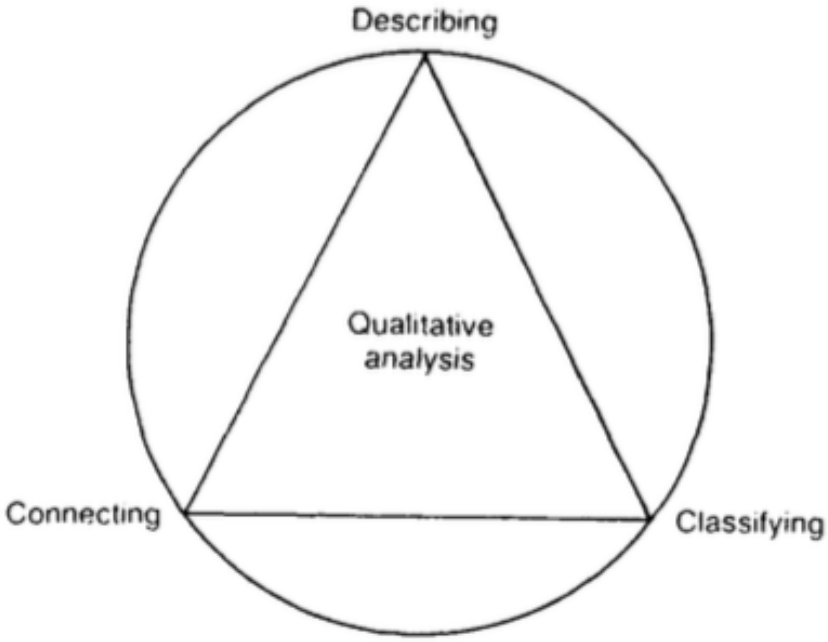


Figure 4-2: Circular way of qualitative data analysis

Source: Qualitative Data Analysis (Dey, 1993)

In the above figure, description is the basis of the analysis and is in the form of raw data such as interview transcripts or typed notes on field observations. The main purpose of the description is to explain the phenomena of interest by highlighting the important or relevant aspects along with maintaining the holism of the data. The second step is classification which is often described "as the constant comparative method where data is compared for similarities and differences" (Glaser and Strauss, 1967 cited by Gray, n.d, p. 18). Similar data is put under the same category and then named and defined (Gray, n.d). It is an integral part of the data analysis because it is a conceptual foundation upon which interpretation and explanation are based. The final stage is the connection of the data which is classified (Dey, 1993). This process is similar to identifying the categories and the researcher will need to conduct these three stages several times until the researcher has captured a deeper and clearer understanding of the key information which is essential to answer the research questions and fulfil the research objectives (Gray, n.d).

Value chain analysis approach was also applied in order to map the current fresh ginger value chain and then identify the constraints and opportunities. It is followed by examining the role of upgrading. Kaplinsky and Morris (2001) stated that there are four basic steps which are important to be carried out. Hence, the following steps were proposed for this study.

- Mapping the range of activities in the existing ginger value chain along with describing the roles of each actor in the chain and their detailed activities. The flow of ginger product from farm to overseas markets was also assessed based on the data collected.
- Identifying the distribution of benefits to actors in the chain.
- Examining the role of upgrading within the chain. This includes an assessment of the constraints and opportunities in the fresh ginger value chain in Myanmar.
- Highlight the role of governance which supports the actors in the chain. It refers to the structure of relationships and coordination mechanisms among the actors. It includes power, trust, collaboration among the actors and relationships of the actors.

4.5. Ethical Considerations

Ethical considerations in qualitative research involves knowing the ethical means and aims of the research explicitly and implicitly (Munhall, 1988). Ethics is defined as "a tangled web of principles where one can usually see the position of the opposition as having some legitimacy" (Munhall, 1988, p. 4). It pertains to doing well and avoiding harm to the participants. During data collection, the researcher should tell the participants that the results will be published (Orb *et al.*, 2001). Cooper and Schindler (2003) stated that it is essential, particularly in research dealing with human participants, that they do not experience any physical or mental harm, as well as not suffer any discomfort or embarrassment from the loss of privacy. Under the Massey University guidelines for research students, the academic research with human participants has to be taken risk assessment from Massey University Human Ethic Committee (MUHTC).

It is the responsibility of the researcher to explain clearly about the research to all participants involved in the data collection. Additionally, the researcher needs to explain the rights of the participants such as the interview session can be stopped at any time if the participants feel inconvenient to respond the interviewed questions. It is also essential not to use any documents or photos that are related to the participants if they feel uncomfortable regarding their documents and photos.

Chapter 5 : Results and Discussion

Introduction

This chapter presents the results obtained from the analysis of information collected in the study area along with its discussion. The chapter is divided into seven sections along with its sub-sections. The first section is general information of the participants who were interviewed during data collection stage. Second section is mapping the fresh ginger value chain, which is the first objective of the study. The performances of the actors who are involved in the chain directly or indirectly are presented in the next section. It is followed by margin and benefit shares of the actors in the local market. The next session is the analysis of the fresh ginger value chain in three components, which is the second objective of the study and it is presented as section five. Section six presented the constraints faced by the Myanmar fresh ginger value chain actors, which is the third objective of this research. The opportunities of Myanmar fresh ginger value chain are presented in the same section. The last section of this chapter is on upgrading options.

5.1. General information of participants

The general information of the value chain participants such as age, gender distribution and education level is shown in the Table 5-1. The average age of the participants who were interviewed is around 40 years. With regard to gender distribution, approximately 95 % of the respondents are male while the rest are female due to the traditional culture of Myanmar in which males are heads of households and have more authority to manage family business in general. In term of land size utilized by the ginger farmers, about 50% of the participants grow ginger on less than one hectare, while the other 50% use more than one hectare for that purpose. The maximum land size owned by farmers interviewed is two hectares. The following table (Table 5-1) shows general information about the participants who were interviewed in the study area and Yangon.

Table 5-1:General information of the value chain participants who were interviewed

Description	Farmers	Middlemen (traders, agent, wholesalers & retailers)	Exporters	Processors	NGOs	DOA
Number	15	8	3	3	3	2
Mean age	42	41	46	39	34	45
Gender distribution	M (14) , F (1)	M (5), F (3)	M (3)	M (2), F (1)	M (3)	M (1), F (1)
Education Level	ME (3), PE (10), HSE(2)	GR (5), MSE (3)	GR (2), HSE (1)	GR (3)	GR (3)	GR (3)

Remark: M= Male, F=Female, ME = Monastery Education, PE = Primary Education, MSE = Middle School Education, HSE = High School Education, GR= Graduated

5.2. Mapping of Myanmar fresh ginger value chain

There are two kinds of value chain maps in the current Myanmar fresh ginger value chains. The first one is the conventional value chain which involves a number of actors starting from input suppliers to importers in overseas and consumers in local markets at the end. The actors involved in the chain are input suppliers, farmers (producers), village collectors, traders, agent, wholesalers and retailers and final consumers in local and importers in overseas markets. Among them, the major actors are farmers, traders and exporters who play a key role in the chain. On the other hand, there is an emerging ginger value chain map which is comprised of input suppliers, farmers, exporters and overseas importers, aiming for the production and export of pesticide-free ginger. The current Myanmar conventional fresh ginger value chain map is illustrated in Figure 5-1.

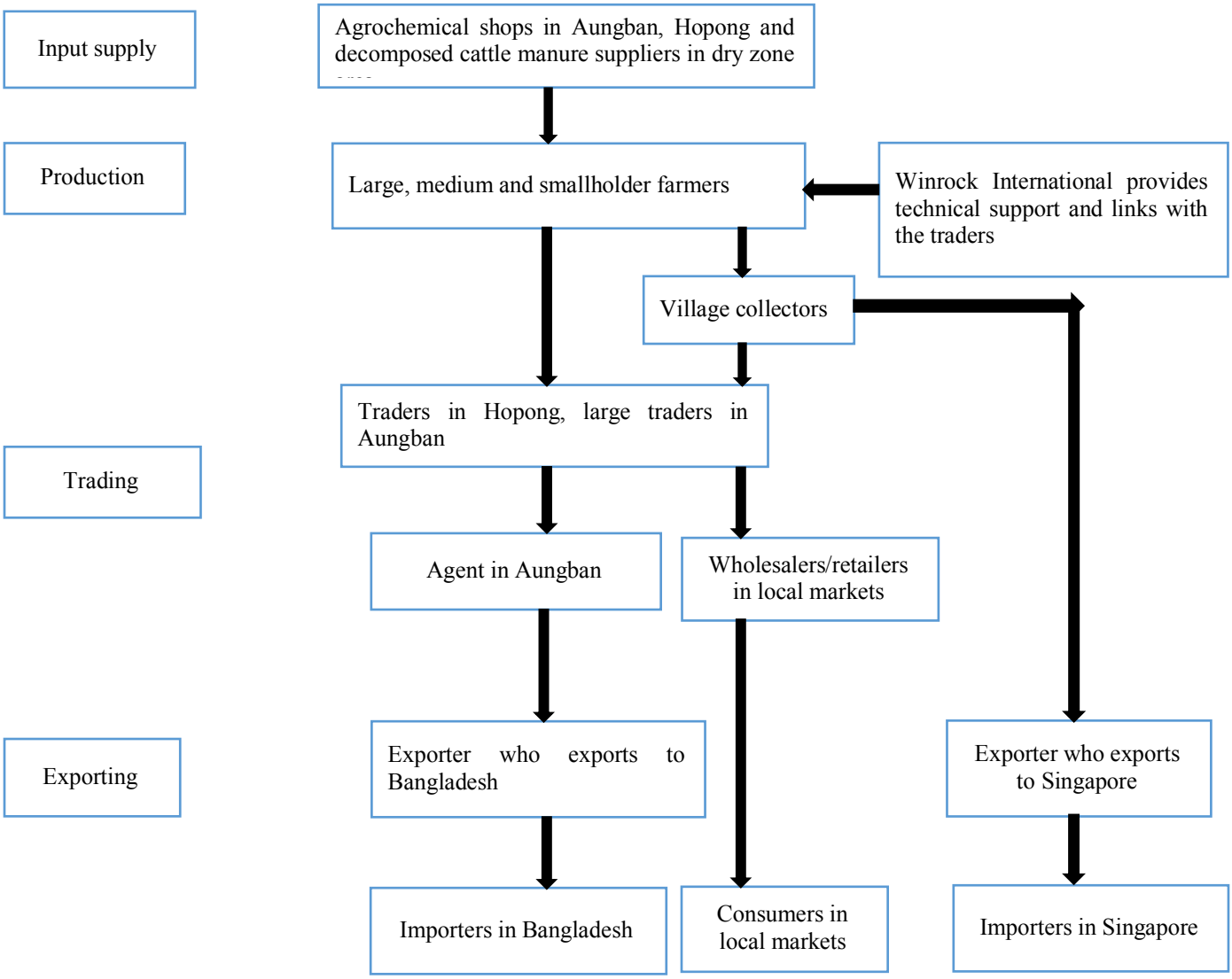


Figure 5-1: Conventional Fresh Ginger Value Chain Map in Myanmar

As illustrated above, there are four stages in the chain. At the production stage, Winrock International has supported ginger farmers for technical aspects in production and linked with the traders for high bargaining power. In the chain, there are two main fresh ginger exporters. The one who exports to Bangladesh is the largest fresh ginger exporter in Myanmar in recent years due to low requirements, as well as a good relationship between the exporter and importer. Most of the actors in the chain are based in Southern Shan State as this is the major ginger production and trading area in Myanmar. At the trading stage, a number of actors, namely traders, agent, village collector, wholesalers and retailers are involved.

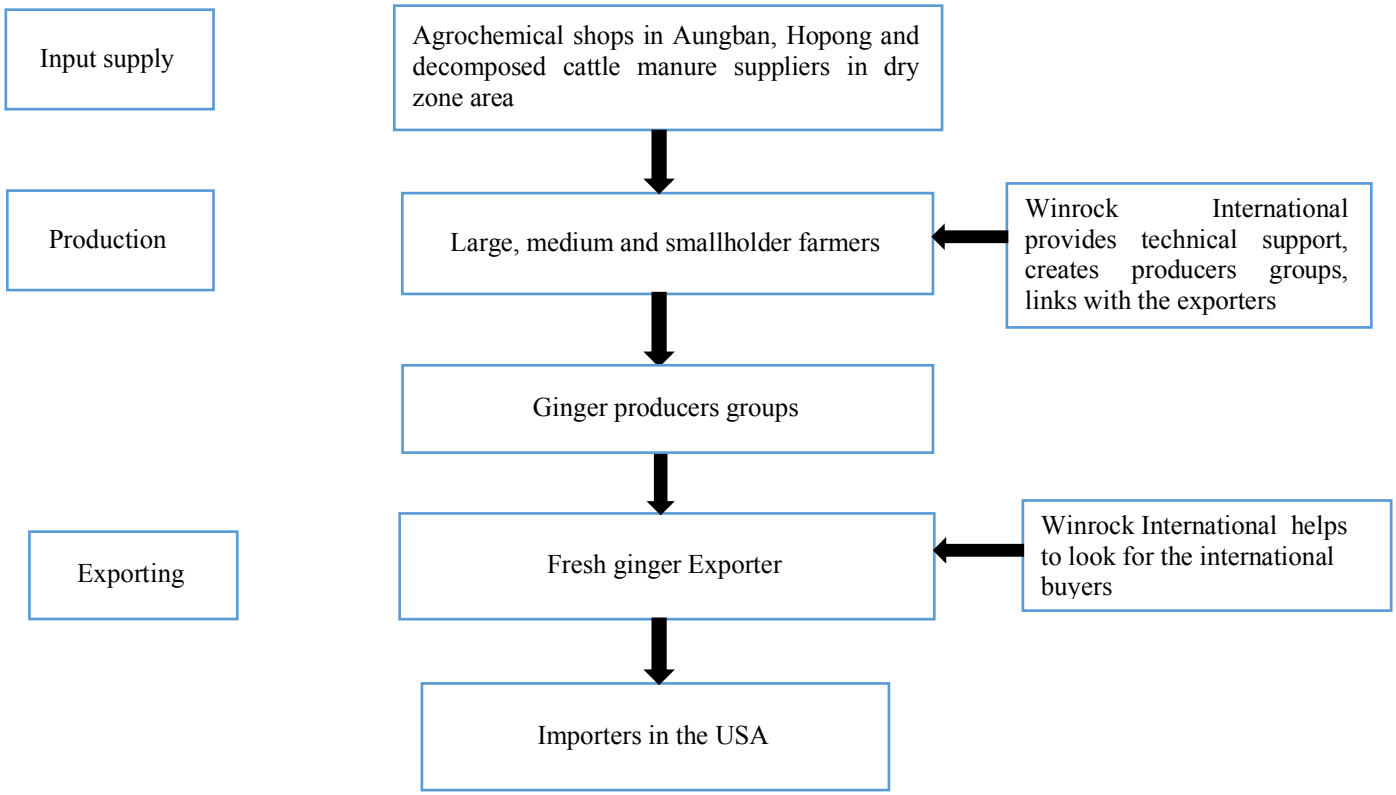


Figure 5-2:Qualified Pesticide-Free Fresh Ginger Value Chain Map in Myanmar

In the case of a pesticide-free fresh ginger value chain, as shown in Figure 5-2, only four actors, namely input suppliers, farmers, exporters and importers are involved, avoiding the rest of the actors due to the nature of the chain, which requires to work directly between the farmers and exporters. Pesticide-free fresh ginger in this study means ginger with an acceptable level of insecticide and herbicide residues. At the production stage, certain amounts of chemical fertilizer are allowed to be used, but no insecticides and herbicides are allowed. The rhizome size of the pesticide-free fresh ginger should be large enough with 250 g in weight per piece. In this study, the map mentioned above (Figure 5-2) is named qualified pesticide-free fresh ginger value chain map because there are also unqualified pesticide-free fresh ginger such as rhizome weight less than 250 g per piece. In that case, these unqualified rhizomes are sold to the local traders. In the chain, Winrock International has provided the technical support to the farmers in the production and creation of ginger producer groups. The farmers in this group take the leading role of working with exporters as well as manage each other not to use the chemical pesticides. In contrast to the conventional chain, Winrock International has helped the exporters to look for the international buyers in the pesticide-free

fresh ginger value chain. The current importers in the USA were first contacted to introduce Myanmar fresh ginger with the help of Winrock International.

As presented above, two kinds of maps are found in the current Myanmar fresh ginger value chains and the actors involved are different, depending on the nature of the chains. Trienekens (2011) states that in a normal food value chain, the actors included are input suppliers, producers, traders, processors, transporters, wholesalers, retailers and final consumers, as well as the regulatory institutions such as Government and NGOs that are not involved directly in the chain. Since the current study is fresh ginger value chains, the role of processor is not included in both maps. Apart from that, ginger does not belong to the group of priority crops in Myanmar and, hence, the regulatory role of Government in the chain is not found so far. However, the role of NGOs, particularly Winrock International, can be seen in both maps.

A similar study was conducted in Nepal on ginger value chain analysis in 2011 and this chain was found to be quite similar to that of Myanmar conventional fresh ginger. Unlike the Myanmar fresh ginger value chain, there was a government support role at production stage. Additionally, many organizations called enablers were also involved in the production stage and provided regular support services such as extension, research and development (R&D), collective action for joint marketing and development of professional standards required by the markets (ANSAB, 2011). The current study indicates that Winrock International has served as an advisor but has not been involved in developing the standards of Myanmar fresh ginger value chains as in the case of Nepal ginger value chain.

As illustrated in the qualified pesticide-free fresh ginger value chain map (figure 5-2), farmers and exporters work directly, but there are no regulators yet that develop and check the standards at each stage of the chain. Additionally, there is no practice of selling the products by the smallholder farmers to other largeholder farmers who have direct contact with the importers in overseas. However, it could happen if the exporters shift the role of exporters only into producers-cum-exporters. In contrast to a study on mapping vegetable supplies from Kenya to the UK, it was reported that there were five stages that have been involved in the chain of producing, transporting, exporting, importing and retailing by the UK supermarkets. In the chain, smallholder farmers and largeholder farmers sell the vegetables to other largeholder producers-cum-exporters, who sell the products to importers

in the UK. The final stage of the chain was retailing at the supermarkets supplied by the category managers. At each stage, there are some regulators that check the standards of the products such as Global-GAP (Legge *et al.*, 2006).

The ginger producer groups presented in the qualified pesticide-free fresh ginger value chain map are not operated in a formal co-ordination yet and, hence, the ginger farmers do not sell their ginger as a collective approach and are unable to manage the post-harvest operation. When compared to a specialty cocoa value chain in Ecuador, smallholder farmers produce and sell to the cooperatives which are comprised of the growers. These cooperatives do the post-harvest management such as fermentation, drying and then bulking. After that, the product is sold directly into the foreign chocolate companies that sell the chocolate into specialty markets (De Backer & Miroudot, 2014). Therefore, it can be interpreted that the performance of Myanmar fresh ginger value chains is still weak in comparison to the performance of agri-products value chains in many other developing countries.

5.3. Activities performance by different actors

5.3.1. Ginger production

Ginger production is comprised of large, medium as well as smallholder farmers in Southern Shan State, where approximately 84% of ginger production is found. With regard to seed rhizomes selection for growing, farmers have been practising the selection of rhizomes from previous crops with the criteria of disease-free rhizomes with many buds and large fingers. Farmers in Myanmar do not usually change the variety as long as the rhizomes look healthy. The farmers advised that " *We have used the current variety since our ancestors and changed the variety only when the rhizomes look unhealthy*". Certain farmers have been using the same variety continuously for more than 20 years.

As mentioned in the background section, the study area comprises two townships, namely Kalaw and Hopong in Southern Shan State of Myanmar. In Kalaw township, the majority of ginger farmers are medium farmers who grow ginger as a major cash crop in rotation with peanut, niger crop and upland rice. Niger crop is an oil seed crop which is cultivated as an upland crop in the hilly region of Myanmar. It is mostly grown as an annual cash crop by the medium and smallholder farmers in Southern Shan State of Myanmar. Most ginger farmers in

Kalaw township practise the fallowing for one to two years in order to avoid soil exhaustion. In contrast to Kalaw township, ginger farmers in Hopong township are smallholder farmers who grow ginger as a non-priority crop and they adjust the priority crop depending on the market price. The following Table shows the crop rotation patterns practised by the ginger farmers in the study area.

Table 5-2: Crop rotation patterns practiced by the ginger farmers in study area

Crop rotation schedule	Pattern I (Kalaw township)	Pattern II (Kalaw township)	Pattern III (Hopong township)
Year I	Ginger	Ginger	Ginger
Year II	Upland Rice	Peanut	Maize
Year III	Niger crop	Upland rice	-
Year IV	Fallowing (1-2 years)	Fallowing (1-2 years)	-

Generally, three types of crop rotation patterns are found for ginger cultivation in Southern Shan State of Myanmar. Patterns I and II are practised by the majority of ginger farmers in Kalaw township, while pattern III is normally practised by the farmers in Hopong township. Upland rice is grown for family consumption and farmers get a small amount of money from peanut and niger crops. Unlike the other parts of Myanmar, farmers in Southern Shan State usually grow just one crop on the same land for the whole year due to the nature of their land type, as it favours growing only one crop throughout the year. The majority of farmers grow vegetables in their backyards as another food source ingredient. Hence, ginger is the only crop that provides a significant amount of finance for their social needs such as education for the children, building a house, health and other social purposes for the farmers in Kalaw township.

Ginger farmers are aware that the ginger crop is a heavy nutrient demanding crop that heavily deteriorates soil fertility and the yield could decline if they grow the ginger continuously on the same land. Hence, the farmers practise both crop rotation and fallowing as shown in Table 5-2. Though farmers in Hopong township are also aware of the benefits of crop rotation and fallowing, similar to the farmers in Kalaw township, they do not practise the

fallowing due to scarcity of land for sparing one year fallow period in favour of a non-major cash crop like ginger for them. The farmers interviewed in Hopong township said that " *Ginger is not a first priority crop for us and it stands as a third major crop after maize and turmeric due to its high fluctuation of market price and hence, we don't take a risk*". Ginger farmers in both townships grow ginger at the same period of the year but the harvesting time is different, depending on many factors.

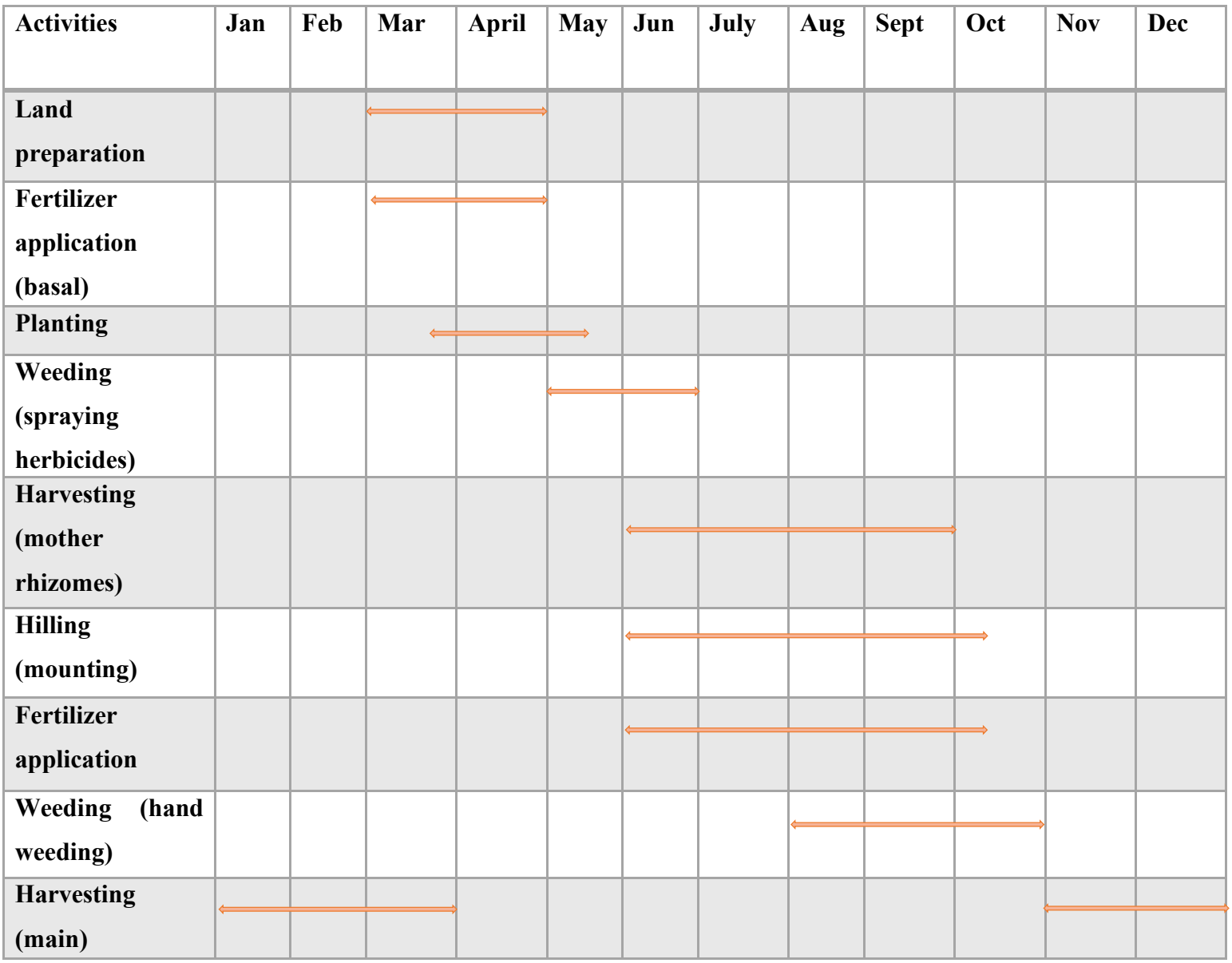


Figure 5-3:Ginger crop calendar practiced by the farmers in study area

As shown in Figure 5-3, land preparation for growing ginger crops is done in March to April, prior to the onset of monsoonal rains, and then followed by an application of basal dose of

fertilizer. Usually fertilizer input is comprised of urea, potash, compound fertilizer and decomposed cattle manure. Depending on farmers' capacity of investment, they use 3-15 bags (50 kg bag) of synthetic fertilizer and 5-10 tons of decomposed cattle manure for one acre of land. Nevertheless, the majority of ginger farmers in Hopong township do not apply the manure due to difficulties of getting the manure as the source is located far away from the farms, unlike the farms in Kalaw township.

Depending on soil type, availability of labour and capacity of investment, some farmers do land preparation such as ploughing and harrowing two to three times from March to April. After that, the farmers start planting seed rhizomes regardless of rain because they assume that seed rhizomes in the soil will start germinating when the rain comes. Weed control is carried out when the rain starts in either May or June by spraying contact herbicides. Most farmers interviewed use the Ronstar 250 EC, which includes Oxadiazon as an active ingredient and its toxic level is III according to the WHO standard as shown in ***Appendix 1.*** The herbicides used by farmers who were interviewed are distributed in Myanmar by Bayer crop science, which is a German multinational pharmaceutical and life sciences company. Spraying herbicides is a common practice adopted by ginger farmers due to its low cost compared to the cost of hand weeding. One ginger farmer interviewed mentioned that "*the cost of spraying herbicides is ten times cheaper than the cost of hand weeding and, hence, spraying herbicide is more economically effective when compared to hand weeding*". Moreover, fresh ginger is a crop that has been facing high price fluctuations, and hence, the farmers do not invest a lot of money in weeding as they are concerned that the earnings from ginger selling may not compensate the production costs.

Ginger farmers in Myanmar used to harvest the seed rhizomes in the early stage of new ginger bush development and these are called mother rhizomes locally. Farmers believe that the ginger plant has already been well established in the field at that time and can grow continuously without support of mother rhizomes. After three to four months of growing, ginger farmers in Myanmar harvest the mother rhizomes from June to September depending on the time they started sowing. There are good markets for these rhizomes both in local and export markets. Local processors and food industry business, which operate their business in the whole year demand the mother rhizomes. For the export market, Bangladesh is the main buyer of mother rhizomes since harvesting time of the rhizomes coincides with the Eid festival by which Bangladesh largely demands the ginger to use in cooking the meat. In

2018-2019 ginger season, one viss (1.63 kg) of mother rhizomes in the local market started at 600 MMK (US$ 0.39) in June and then increased to 1,000 MMK (US$ 0.65) in September 2018, which is a lucrative price for the farmers.

According to the farmers interviewed, harvesting of the mother rhizomes does not have any impact on the plants and quality of the rhizomes in the main harvest. Farmers said that "*We are skillful in harvesting the mother rhizomes without having any impact on the ginger plants because we have harvested the mother rhizomes since our ancestors*". Unlike the main harvest, harvesting of mother rhizomes does not largely depend on the level of money requirement and farmers harvest them because they assume that it is time for harvesting. If the ginger price is good, like the 2018-2019 season, earning from mother rhizomes could cover the production costs while earning from the main harvest makes the profit.

The following figure shows removing of mother rhizomes by the farmers during rainy season.

Figure 5-4: Harvesting of mother rhizomes by the farmers

Photo credit: Winrock International

After harvesting the mother rhizomes, the next step is hilling which is also called earthing up, aiming to get good rhizomes with large fingers. Hilling is carried out after harvesting of mother rhizomes in order to get the big rhizomes in the main harvest and then, fertilizer is applied as the first top dressing. Harvesting of mother rhizomes, hilling and the second

fertilizer application are carried out as crop management practices in a combined event of the crop calendar. Depending on the time of second fertilizer application, second-time weeding is also carried out from August to October, which is the rainy season period in Myanmar. At that time, ginger farmers do either hand weeding, depending on availability of labour and capacity of investment or spray herbicides. The main harvest of ginger rhizomes usually commences in November and then continues until March of the subsequent year, depending on the level of financial requirements by the farmers as well as the demand for land for growing the next crop. Most of the ginger farmers usually harvest their ginger just one to two days prior to selling in order to avoid weight loss, as fresh ginger has a high water content, and is susceptible to rapid weight loss after harvesting.

Farmers use sacks made of plastic, or bamboo baskets, as packaging materials and use the small truck, locally called “troulargy”, to transport their fresh ginger to the nearest town for selling. Figure 5-5 shows the transportation facilities for ginger used by farmers in study area.

Figure 5-5: Ginger transportation facilities used by the farmers in study area

The Table 5-3 shows ginger production cost and profit per acre of land calculated by farmers.

Table 5-3: Average cost and benefit of production per acre (0.4 hectare) of ginger (in US$)

Items	Quantity	Unit	Rate per unit (US$)	Total (US$)
Seed rhizomes	1,000	Viss	0.65	650
Land Preparation	2	Time	16.31	32.62
Cattle manure	3	Truck (653 kg)	22.83	68.49
Fertilizer	5	Bag (50 kg)	13.05	65.25
Making furrows	3	Man-day	3.26	9.78
Transportation of rhizomes	2	Bullock cart	3.26	6.52
Cutting rhizome for cultivation	4	Man-day	3.26	13.04
Planting cost	20	Man-day	3.26	65.2
Herbicides	2	500 cc	3.91	7.82
Spraying herbicides	1	Man-day	3.26	3.26
Harvesting of mother rhizomes	25	Man-day	3.26	81.5
Hand weeding	20	Man-day	3.26	65.2
Harvesting (main harvest)	40	Man-day	3.26	130.4
Transportation from farm to house	70	Basket	0.33	23.1
Transportation from farm to towns	70	Basket	0.66	46.7
Total cost				1222.18
Income from selling	3500	Viss	0.66	2310
Profit from ginger production				1087.9

1 viss = 1.63 kg

1US$ = 1,531.15 Myanmar Kyat (MMK) as of February 2019

Remark: The calculation table is based on the data collected in 2018-2019 ginger season. Cost and benefit could be changed every year depending on the price of inputs and fresh ginger

As shown in the above table, the profit received by a farmer from the ginger production per acre of land is US$ 1087.9. In the Table, the cost for seed rhizomes is also calculated in order

to know the cost and profit, even though the farmers do not usually need to buy the seed rhizomes. It is also obvious that the cost difference is high between spraying herbicides and hand weeding costs. Among the activities, the most laborious activity is the harvesting of ginger, which requires 40 people, then followed by planting and hand weeding that demand 20 people for each. In Myanmar, particularly in Southern Shan State, there are some interesting factors that make the farmers harvest and sell the ginger regardless of market price.

5.3.1.1. Factors influencing ginger harvesting

In Southern Shan State, particularly Kalaw township, cash requirement incidents appeared to be the main factor that have made farmers harvest and sell their ginger regardless of the prevailing price as ginger is the only cash crop that provides the money they required. The farmers in Kalaw township regard the ginger crop as their banks and, hence, the volume of harvested ginger depends on how much money they need. One of the farmers interviewed mentioned that " *I harvest and sell the ginger only when I require the money and I do not care about the price whether it is high or low because ginger is the only crop that provides the main income to my family*". Thus, the majority of farmers do their harvesting as several events, part by part during one season, making them manage the marketing risk caused by price fluctuation, even though they do not aim for that purpose.

In addition to serving ginger as a major cash crop, other factors that contribute to the harvesting and selling of ginger is the experience faced by the farmers in Kalaw township with the microfinance program. In the last decade, farmers borrowed money from the program instead of selling the crop at the time of low market price. According to the rules of the microfinance program, the farmers had to return the money to the program at the right time in order to be eligible to borrow money again next time. At that time, the farmers had to sell their properties in order to return the money to the program, making the farmers lose their properties. Consequently, the farmers were afraid of borrowing money from the microfinance program, therefore, in recent years, the farmers harvest and sell the ginger only when they require the money. However, in the case of Hopong township, harvesting of ginger depends on availability of labour and market price as ginger is not a major cash crop like the case of Kalaw township.

5.3.2. Ginger Trading

Ginger trading is being operated by a number of actors including village collectors, traders, and agents, who collect ginger from the traders for the exporters, wholesalers and retailers. A few of the village collectors are found at this stage who collect ginger either for exporter or sell to the traders in the town. Traders are the biggest group and play a key role at this stage and buy ginger directly from individual farmers and also a small number of village collectors. Approximately 30 ginger traders in Kalaw township and five small traders in Hopong township are in operation. These traders sell ginger to agents, wholesalers and retailers in domestic markets like Yangon and Mandalay. In some years when export demand was high, exporters from Yangon and buyers from regional markets, such as Bangladesh, Pakistan and India came to Aungban in Kalaw township and bought ginger directly from the traders. Those buyers used to transport ginger by trucks through border trade.

At the trading stage, agents also play a key role as they collect ginger from the traders for the exporters in Yangon. Traders in Southern Shan State trade, not only ginger, but also other major crops in the area such as garlic, turmeric and other vegetables, which can provide income for the whole year. The traders interviewed mentioned that "*We need to do trade with other crops as well in order to get income for the whole year since ginger is a seasonal crop that can be traded for a maximum period of six months only*". Most of the traders have been trading ginger for a long time as ginger is one of the major cash crops in Southern Shan State. Fresh ginger is the main traded form in Myanmar, and dried and sliced gingers are also made only when the price for the fresh ginger goes down and as a market driven practice. Nevertheless, there are processors-cum-exporters who make and export both organic and conventional dried and sliced ginger to the EU and other high price markets due to the demand by those markets.

In the local market, ginger is graded into four grades depending on the rhizome size at traders, wholesalers and retailers' levels. The grading categories are first grade (special one), second grade, ungraded bulk (a mixture of different rhizome pieces) and lowest grade. Table 5-4 shows the brief characteristics of each grade and retail price at Yangon market, along with sample photos.

Table 5-4: Ginger grades and their characteristics in local market

Grades	Characteristics	Retail price in Yangon market (per viss) as of February 2019	Photo record
First grade	• Biggest size • Approximately 312 g per piece • Fungus and debris free • Large fingers	1,800 MMK (US$ 1.18)	
Second grade	• Second biggest size • Approximately 100 g per piece • Fungus and debris free • Fingers with moderate size	1,600 MMK (US$ 1.04)	
Third grade	• Mixture of different sizes • ungraded one	1,400 MMK (US$ 0.91)	
Lowest grade	• Smallest size • Approximately 50 g per piece	1,200 MMK (US$ 0.78)	

The price difference between the grades is around 200 MMK (US$ 0.13) per viss based on the data collected in February 2019. At that time, the price difference between the Aungban trading center and Yangon retail market was 12,40 MMK (US$ 0.81) per viss. Local markets such as Yangon and Mandalay, which are the biggest cities, prefer the first graded ginger due to the demand by hotels and restaurants. Additionally, local consumption is also driven by the food industry such as roasted sunflower seeds, fried beans, potato chips, preserved plum business, and festivals by which people serve the ginger salad to the guests who visit these festivals. Myanmar people also consume ginger salad together with pickled tea as a traditional food in their daily lives. Eating ginger salad alone, or together with pickled tea, is a popular food in many parts of Myanmar. However, local consumption is still low in comparison to the quantum of ginger production. One trader mentioned that " *local market can absorb only 10 percent of total production and hence, the rest of production needs to be exported, however, there had been certain years in which fresh ginger demand by the export market was low, as a result, fresh ginger were processed. However, selling fresh ginger is more profitable than selling processed ginger but we do not have options at that time*".

5.3.3. Ginger Exporting

There are a number of ginger exporters in Myanmar, but only a few export fresh ginger. This is because the export is associated with the additional risk of unstable prices for fresh, perishable products which are prone to fungal attacks as well as other product deterioration during transit. Currently, the main export market for Myanmar fresh ginger is Bangladesh and a small quantity of fresh ginger has been exported to Singapore, however, the buyer is from India who has a distribution office in Singapore. In addition to that, there is an exporter who has just commenced exporting fresh ginger to the USA as a trial shipment. Cleaning and washing are done at the exporters' level and refrigerated containers with control atmosphere are being used during shipping to overseas.

The exporter who exports the fresh ginger to Bangladesh has been exporting since 2001 and then the business stopped in 2005 due to the entry of a large quantity of ginger from Bhutan to Bangladesh market, causing oversupply in the market and approximately US$ 45,000 was lost at that time. The exporter resumed the business in 2015 as a result of fresh ginger demand by the buyers and, since then, has exported approximately 10,000 tons of fresh ginger every year through border trade and overseas trade. About 50 % of the export is made

through the border trade and the rest is through the overseas trade. The exporter prefers the border trade since there is no requirement of documents such as phytosanitary certificate, insurance and commercial invoice. Moreover, it is a faster route to receive the money from the buyers due to a short delivery time of only a week. In the case of overseas trade, fresh ginger is transported by ship, which normally takes a month and the buyers make the payment only after receipt of the products.

The exporter does not need to wash the ginger but cleaning, such as removing the soil and residues, is adequate for exporting fresh ginger to Bangladesh. Other requirements for overseas trade are phytosanitary certificate, country of origin (C/O), packing list, commercial invoice, insurance, inspection certificate of weight and quality, and radiation certificate. The phytosanitary certificate has to be obtained from the Plant Quarantine section at the Plant Protection Division of Department of Agriculture through an application procedure. The exporter uses a service of an agency that provides services for that kind of application to the government office. The exporter said that "*service fee for the application of the phytosanitary certificate is cheap and hence, it is better for me to go through the agency rather than I do it myself"*.

Exporting of fresh ginger to Bangladesh takes place throughout the year since there are two harvests of ginger in Myanmar: harvesting of mother rhizomes and main harvest as already discussed in the ginger production section. Myanmar is one of a few countries that harvests mother rhizomes at three to four months after planting and, hence, there is no competitor for the export market at that time. As a matter of fact, the exporter said that "*the quality of mother rhizomes is inferior when compared to the quality of rhizomes from the main harvest*". Nevertheless, the buyers in Bangladesh do not care much about the quality and they even buy damaged ginger caused by improper transportation as well as the handling method, but they do care about the price. Therefore, the requirements for the Bangladesh market are not high and price is the only decisive factor for purchasing.

Traders and exporters stated that "*Bangladesh is not a reliable market for Myanmar fresh ginger and may not buy ginger from Myanmar if India can provide the ginger that Bangladesh requires since India has transportation advantage over Myanmar and takes only 3-4 days through the border trade*". The traders also mentioned that the demand from Bangladesh was high in the 2018-2019 ginger season due to floods in India and, as a result,

the ginger yield in India declined and, consequently, there was no surplus ginger for export to Bangladesh. In terms of transaction, both suppliers and buyers have to go through the banks in Singapore because there is no direct link between the banks in Bangladesh and Myanmar, and the banking cost has to be covered by both parties.

The exporter who exports the fresh ginger to Singapore has been exporting over the last seven years. The exporter said that " *We do not know exactly what is the purpose of ginger imported by Singapore but we assume that it may re-export to the EU markets*". The document requirements are phytosanitary certificate and country of origin (C/O) only for Singapore. In order to export to Singapore, the exporter needs to do cleaning and washing before the ginger is shipped. There is no need for a grading process, but sorting is required in order to remove the small and broken rhizomes. The exporter used to export the fresh ginger to Malaysia 15 years ago and then ceased as the buyers stopped buying ginger from Myanmar, but the exporter did not know the reasons for stopping.

In general, it is hard to estimate the exported quantity to Singapore and approximately 350 tons of ginger has been exported in the 2018-2019 season already. There may be more orders soon but the exporter cannot make a prediction on the exporting quantity on an annual basis. The exporter mentioned that " *We are not able to predict the export volume every year since the volume can be unstable*". The suppliers for the exporter are village collectors who collect ginger directly from the farmers. The exporter does not have regular suppliers and purchase the ginger if the quality and price meet the market requirements. Unlike the exporter who exports to Bangladesh market, fresh ginger exporting is done only in a three to four months period in a year during the main harvest season. This is because the requirements by the Singapore market is higher than that of the Bangladesh market, suggesting that the quality of mother rhizomes does not meet the requirement of the Singapore market. The exporter has about four buyers in the Singapore market but cannot provide to all the buyers every year and supply to the buyer based on the price offered and quality they demanded.

Like the farmers, the exporter also used the sacks made of plastic as packaging materials for transportation of ginger from production area into Yangon where the seaport is located. Sorting such as removing of small rhizomes, cleaning and washing are then carried out at the warehouse in Yangon. According to the exporter, ginger is often damaged during transportation from the production area to Yangon, and about 25-40 % of losses are found

because of improper transportation and packing materials, which cause the rhizome breakage. Those damaged rhizomes are sold to the wholesalers and retailers in local markets at the lowest price. Additionally, about 10% of weight loss also occurs during the storage period, which usually takes a month.

In addition to Bangladesh and Singapore markets, Myanmar fresh ginger has also been exported to the USA as trial shipments for two years to two different buyers since 2018. As illustrated in the qualified pesticide-free fresh ginger value chain map, the exporter was helped to look for the buyers in the USA by Winrock International under a project named "Value Chain for Rural Development (VCRD)". The first year of exporting was in the 2017-2018 ginger season and 800 kg of fresh ginger was exported to the USA as a sample. The second round of exporting is scheduled for the 2018-2019 ginger season and 8 tons of fresh ginger will be exported, although the aim was for 120 tons. The buyers in the USA only accept ginger either grown by using Global-GAP or organic practice. Although it is exported as pesticide-free ginger, there is no analysis yet in Myanmar to prove that it is pesticide-free ginger. Since the exporting is still in the trial stage, the buyers have not demanded the Global-GAP or organic certificate yet, but the buyers will demand it in the case of large volumes in due course. The requirements for the USA markets are the Global-GAP or organic certificate, phytosanitary certificate, country of origin (C/O) and USFDA certificate, no fungus, no decay and zero soil residues. Additionally, the rhizome weight must be 250 g as a minimum requirement. Carton packaging is used as a packaging material and then put in the refrigerated containers which are shipped via the Singapore port, taking 45-60 days to reach the product into the USA.

As presented in the ginger production section, ginger farmers in Myanmar harvest the mother rhizomes traditionally, getting two harvests during one ginger season, which gives the farmers two incomes. However, the exporter does not recommend the harvesting of mother rhizomes, which could have an impact on the quality of ginger in the main harvest as well as have more chances of disease spread by causing injury to the plants. The exporter takes responsibility for the post-harvest process including collection of ginger from farms, cleaning, sorting, washing, drying and packing. With the support of Winrock International, the exporter has invited the farmers to visit the factory where the farmers can see and have the chance to understand how to manage the post-harvest process in order to make sure that the product meets the market requirements.

5.3.4. Ginger Import by the USA

It seems that importing of fresh ginger from Myanmar by the USA has commenced in 2018. As mentioned in the exporting section, buyers during the two year period are different, but the supplier from Myanmar is the same. Nevertheless, no information is available on the reasons for discontinuing the importing of fresh ginger by the same first buyer for the subsequent year. According to the view of the USA buyer in the second year, the main reason for importing fresh ginger from Myanmar is that they want to have another competitor to Chinese ginger in the USA market. The importer is currently importing fresh ginger mainly from China due to its competitive price. The other imported countries are Peru for organic ginger, Brazil for quality and non-Chinese alternative and Thailand for a non-Chinese alternative. Similarly, the importer is also interested in importing ginger from Myanmar as a non-Chinese alternative from Asia and, hence, decided to import in the 2018-2019 ginger season as a trial shipment. Since the product has not been delivered yet to the USA during data collection stage, the importer cannot advise the quality of Myanmar ginger.

5.3.5. Supportive role of NGOs

The three NGOs, namely Winrock International, ILO and MEDA are currently supporting ginger activities in Myanmar. Among them, Winrock International has been supporting the ginger sector since 2016. The main reasons for choosing ginger crop to be supported are 1) ginger is grown by many smallholder farmers 2) ginger has high potential for export market and 3) there is very little contribution of Myanmar ginger to the world market when compared to production volume. Therefore, Winrock International chose the ginger crop to be supported under the project entitled “Value Chain for Rural Development (VCRD)” with the aim of increasing productivity and then achieving inclusive agricultural growth. Winrock International has supported a number of actors, particularly farmers, processors and exporters since all these actors are key players of the ginger value chain in Myanmar.

At the farmers’ level, a technical package which includes cultivation methods such as plant spacing, intercropping, use of bio-fertilizer such as EM-Bokashi and mulching practice has been provided to 6,000 farmers in Southern Shan State including the study area since 2016. In term of spacing, Winrock International has recommended that the farmers to space 3’x1.5’

between rows and between plants aiming for about 10,000 plants per acre of land. Currently, farmers space 2.5'x6" between rows and between plants, which attributes to the high cost for the seed rhizomes. Farmers normally use the seed rhizome which is about 0.10 viss, which is equivalent to 163.29 g weight, but Winrock International has suggested using the rhizome piece of 0.03-0.05 viss (48-131g) weight. Winrock International has recommended intercropping ginger with pigeon pea for provision of shade which, in turn, reduces a certain level of disease spreading, particularly bacterial wilt, and soil fertility improvement is also expected as pigeon pea is a nitrogen fixing leguminous plant. Nevertheless, farmers prefer to intercrop ginger with either maize or sunflower, assuming that pigeon pea plant would be a host for many pests and diseases.

Apart from that, Winrock International has been helping some farmers to establish their own farms to produce seed rhizomes since there is no farm yet in Myanmar that produces the seed rhizomes commercially. As already mentioned, ginger farmers usually choose the seed rhizomes by selecting the good rhizomes from the previous harvest. Among the 6,000 farmers who were provided with the technical package, approximately 30 % have been practising the procedures recommended by Winrock International. Hence, this technology adopted by the farmers can enable them to sell their ginger to the exporter who exports ginger to the USA as pesticide-free ginger.

At the farmers' level, Winrock International convened to create ginger producer groups in 32 villages, aiming for empowering higher bargaining power for the farmers with the traders and exporters, as well as giving the knowledge for production of organic or Global-GAP ginger for export markets, particularly high price markets. Among these 32 groups, two groups have already received registration from the Government to operate as a cooperative for one group and an association for other group. These producer groups have then been helped by Winrock International to link with the exporter who exports to the USA market. At processors and exporters' levels, Winrock International has linked the buyers in the USA as well as the organizations that support the local businesses in Myanmar by providing grants. With the help of Winrock International, one current fresh ginger exporter, namely, Green Eastern Agriculture (GEA) Company Ltd achieved the eligibility criteria to start exporting pesticide-free ginger to the USA in the 2017-2018 ginger season.

Another NGO, which is ILO, has supported the ginger sector in Myanmar in some aspects under the project entitled "Vision Zero Fund" which was started in 2017. The aims of the project are to enhance prevention, protection, and compensation of work-related injuries, diseases, and deaths in the industries operating in the global supply chain (GSCs). Ginger was selected for OSH support based on the assessments. The assessment result showed that 1) ginger has high potential for export market 2) international buyers, especially the USA and the EU, are likely to invest in OSH, paying attention to social responsibility for the products that they import, particularly from developing countries 3) labour cost in the ginger sector is paid by the farmers and buyers and, hence, the interventions that improve the work efficiency would translate the lower cost of price to consumers, meaning being competitive in the markets and 4) USAID funded value chain project implemented by Winrock International can provide the groundwork for the OSH project.

ILO, in collaboration with Winrock International, provided the OSH training to the ginger traders in order to have a secure working environment for the employees who are working at the ginger trading centres in Southern Shan State. Since Winrock International is terminating the project in June 2019, ILO is planning to provide the training on financial management, bookkeeping and negotiation to the ginger producer groups formed by Winrock International in 32 villages. Additionally, ILO is going to support the farmers to get the Global-GAP certificate in collaboration with a certification body, namely Control Union, however, the cost has to be covered by the farmers.

In addition to these organizations, MEDA, which is a Canadian-based NGO and has a branch office in Myanmar, has provided the farmers with irrigation sets for kitchen crops under the project entitled "Improving Market Opportunities to Women" since 2015, with the aim of increasing opportunities for the women. Although MEDA has not supported the ginger sector directly, it is supported under the kitchen crops as ginger falls under the category of kitchen crops in Myanmar. The cost for the irrigation set has to be shared half and half by MEDA and the farmers. MEDA has also linked the farmers who are not capable of paying from their own money for the farmer share of 50% irrigation cost to share the cost with the microfinance associations that charge 2.5 % interest rate. On the other hand, MEDA has also supported the local business by providing grants. Similar to the case of farmers, business owners have to share the cost half and half with MEDA. Among the ginger actors who were interviewed, GEA, that exports pesticide free ginger to the USA and processor-cum-exporter who has

made organic dried sliced ginger and exported to the EU, received a supplementary grant from MEDA.

5.3.6. Supportive role of the Department of Agriculture (DOA)

Since the study area belongs to Kalaw and Hopong townships, DOA staff in these townships were interviewed. In the 2018-2019 ginger seasons, 893 hectares are used for ginger crop in Kalaw township while 176 hectares are also used for ginger production in Hopong township. About 20 years ago, there was a ginger production farm in Southern Shan State that produced seed rhizomes but it ceased operations many years ago and DOA staff in both of the above townships did not know the reasons for its closure. Since ginger does not belong to the group of priority crops like rice and pulses in Myanmar, the attention by the Government on ginger is very negligible. Nevertheless, being one of the major crops in Southern Shan State and at the request of the farmers, DOA in Kalaw township established two ginger demonstration plots in order to find the control measures for the diseases such as fusarium stem rot and bacterial wilt in the 2016-2017 ginger season. Additionally, DOA in Kalaw township has linked the farmers with the processors-cum-exporters who make and export processed organic ginger to the EU. When the NGOs, such as Winrock International and ILO organize training sessions, DOA staff also participate.

5.3.7. Role of certification body in Myanmar

A certification body called “Control Union” is an operation in Myanmar that provides more than 200 different certificates worldwide (around 75 countries) including Global-GAP and organic certificates. Control Union is the Netherlands-based certification company and has been working in Myanmar since 2014 following a feasibility study that was conducted in 2013. The common certificates requested by the companies and organizations in Myanmar are organic EU, organic USDANOP and JAS. Approximately six companies that are working with smallholder farmers have been certified for organic production of ginger and one group farmer certification request is in the process for the Global-GAP certificate for the ginger crop. Global-GAP certificate is an internationally recognized standard aimed at Good Agricultural Practice at farm. The certificate covers the following areas.

- Food safety and traceability
- Environment (including biodiversity)
- Workers' health, safety and welfare
- Animal welfare

Control Union follows the rules and regulations laid by Global-GAP standard. Control Union does not provide the technical assistance to farmers, instead, general training is provided through which the compliance requirements are explained in detail. Inspection results are submitted for the certification team, upon which the certification is made. The certification process is evaluated by the accreditation body (Dutch Accreditation Council) as well as the Certification Integrity Program (CIPRO) of Global-GAP. The certification fee is calculated based on the time required for the completion of the assessment (inspection and certification). Learning from four years' experience in Myanmar, it is revealed that the usage of agrochemicals is rapidly increasing, though it is still less when compared to neighbouring countries such as Thailand, China and India. Moreover, the specific characters of ginger plant, as well as the traditional cultivation practices (crop rotation and fallowing practice) reduces the need for synthetic agri-inputs for soil fertility as well as for crop protection. It is also understood that farmers' groups organized by the companies perform well in organic practices when compared to farmers who perform individually. However, the strong position of the middle-men (collectors/traders) in the agricultural value chains in Myanmar has hindered the flow of benefits towards the farmers, as farmers depend on them for logistics and finances.

5.4. Margin and benefit shares of the actors

As discussed in the previous section, conventional fresh ginger value chain is comprised of a number of actors and the profit obtained by each actor is different depending on their position and level of investments. Moreover, production area and major markets are located in different regions, which implies the losses during transportation, storage, and handling as well as the operational cost which would be imposed by different actors.

Table 5-5: Average price of fresh ginger received by different actors in local market

Actors in local market	Average price per viss (US$) as of Feb 2019	Price margin per viss (US$) as of Feb 2019
Farmers (n=15)	0.7	
Traders (n=4)	0.79	0.09
Wholesalers (n=3)	0.81	0.02
Retailers (n=2)	1.6	0.79

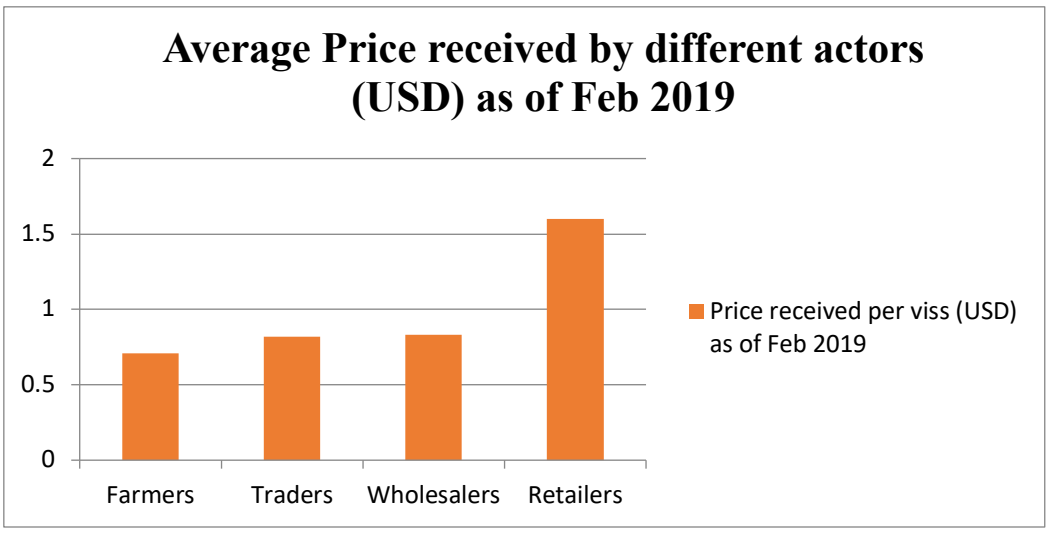


Figure 5-6:Average price per viss of ginger received by different actors in local markets

As shown in Table 5-5 and Figure 5-6, the price received by the farmers is the lowest among the actors since they are located at the primary production stage like other agriculture commodities. When compared to the price received by the farmers and that received by the retailers, it was found that the price difference is more than double. Nevertheless, it does not mean the retailers receive the high profits, but it seems to be due to the other costs such as transportation and operation costs imposed by the actors throughout the chain. The traders do not usually impose the high profits to buyers since the majority of their buyers are agents and wholesalers who buy large volumes of ginger, which makes it profitable to the traders even though they do not impose a high profit per unit. Additionally, traders in Southern Shan State, particularly Kalaw township, cut 5-10 % of money from the farmers as a commission fee. Hence, traders get earnings from two sources: one is from the profit of ginger buying and selling and another one is as a commission fee. In the 2018-2019 ginger season, fresh ginger price is much higher when compared to that in previous years due to high demand from

Bangladesh. In fact, local demand is low due to higher prices and, hence, wholesalers and retailers cannot achieve high profits in the season.

5.5. Value chain analysis of Myanmar fresh ginger

The value chain analysis of Myanmar fresh ginger with its three components: network structure, value addition and governance structure are discussed in this section as follows.

5.5.1. Network structure of Myanmar fresh ginger value chain

Network structure has two dimensions: vertical and horizontal in which the vertical dimension shows the flows of products or information from producers to consumers while the horizontal one shows how the actors in the same level coordinate among each other (Trienekens, 2011).

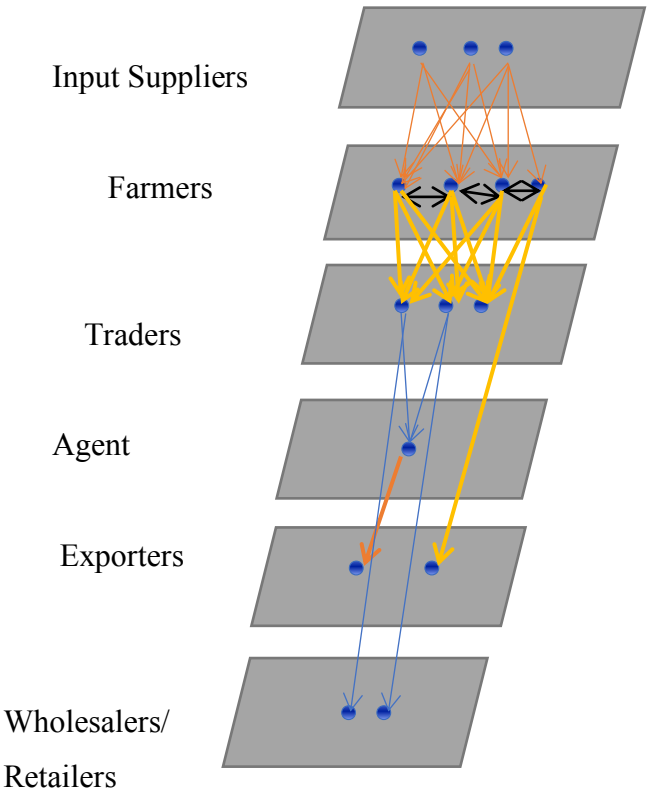


Figure 5-7: Network structure of current Myanmar fresh ginger value chain

The Figure 5-7 shows the horizontal and vertical structure of Myanmar fresh ginger value chain. As shown in the above figure, farmers buy the inputs from the suppliers who have a long-term relationship with them. These suppliers could be agrochemical shops or the traders

who buy the ginger from the farmers. The suppliers also sell the inputs, either on cash, or on credit, along with a charge of approximately 5% interest rate per month. The farmers who buy the inputs from the traders on credit are usually loyal and sell their ginger at harvest time to the same traders. At the farmers' level, there is a horizontal coordination due to the ginger producer groups which were formed by Winrock International. Additionally, horizontal coordination exists among the farmers, especially those who are living in the same village.

It is stated that a network structure can affect the knowledge transfer among the actors regardless of the effects of common knowledge of those actors and tie strength and, hence, previous research described the network structure as an integral part of the transfer process (Reagans & McEvily, 2003). This is consistent with the findings of Myanmar fresh ginger value chain in which the farmers get the market information from the other farmers in and outside the villages who are part and partial of the form of the horizontal relationship. The farmers also share the knowledge on agronomic practices such as production techniques, pests and disease control measures, and even share the cost of transportation by renting trucks as a group for transporting their ginger to sell in town, even though they sell individually.

A vertical relationship has been found along the chain in which the farmers, wholesalers and retailers get the market information from the traders in the case of conventional fresh ginger value chain. Owing to the requirement of direct linkage of exporters with the farmers in the pesticide-free ginger value chain, the farmers become aware of the requirement by the markets from the exporters straight away, by skipping the rest of actors in the chain. Granovetter (1985) stated that the relationship between the participating actors could be stronger by the factors such as frequency, emotional intensity, intimacy and the reciprocal services. This phenomenon was reaffirmed with the findings of this study in certain aspects. In the case of the relationship between the traders, agent and exporter, they have worked together since seven years ago and arranged the price which is convenient for each other. Hence, there has been a strong relationship between them as a form of vertical dimension. In the case of the pesticide-free ginger value chain, due to a short period (1-2 years) of relationship between the farmers and the exporters, the relationship between these actors is not strong enough yet, although some forms of vertical dimension can be seen among the actors.

According to Trienekens (2011), the business relationship could be stronger by having agreements among the participating actors, either oral agreements or written contracts. Nevertheless, there is no official written contract yet and only verbal agreement is made between the farmers and the exporters in the pesticide-free ginger value chain of Myanmar, giving freedom to the actors to break away from the rules easily. This could be considered as a weakness of the current pesticide-free ginger value chain in Myanmar. A study on the relevance of business practices in linking smallholders and large agri-business in Sub-Sahara Africa showed that certification such as Global-GAP, organic and Fairtrade is an agent of change and positively correlated with the relationship of smallholders and exporters. This means that following the standards makes a stronger relationship and coordination between the participating actors (Kleemann, 2016). In Myanmar, all buying and selling of ginger between different level of actors, particularly at the traders, agent, exporters, wholesalers and retailers' level, is done based on the long term informal understanding type of relationship and spot market price. Making a contract between the participating actors that could create strong network structure is not a usual practice in Myanmar for many agricultural commodities including fresh ginger.

5.5.2. Value-adding

Value-adding is created by different actors at different stages throughout the chains (Trienekens, 2011) and the ability of a firm to provide superior value to its customers is one of the most important strategies for success since the 1990s (Ravald & Grönroos, 1996). There are a variety of ways to add value in agriculture products such as cleaning and cooling, packaging, processing, distributing, cooking, combining, grinding, drying, smoking, handcrafting, spinning, labelling or packaging (Born & Bachmann, 2006). At the farmers' level, it was found that value-adding is done throughout the production process from selecting seed rhizomes into harvesting in both conventional and pesticide-free fresh ginger value chains in Myanmar. As described in the ginger production section, ginger farmers chose the seed rhizomes by using criteria such as free of diseases, having many buds and bigger rhizome size to get the healthy plants. Depending on their capacity of investment, the quality and quantity of inputs that were used may be different. For example, in conventional fresh ginger production, farmers use herbicides to control weeds, while farmers do not use herbicides, but practise hand weeding and other measures such as mulching in the case of

pesticide-free ginger production. However, value-adding by the farmers at post-harvest stage has not yet been found in the current Myanmar fresh ginger value chains both for conventional and pesticide-free ginger. This is because the farmers have been in the traditional value chain in which the products from the farms are sold directly into the market instead of making value-addition activities over generations.

At the traders' level, value-adding, such as sorting and grading, is being practised depending on the market requirements. Similarly, wholesalers and retailers also grade due to the demand by the hotels and restaurants in local markets like Yangon and Mandalay. At the exporter level, sorting, cleaning and washing have been practised since the buyers, particularly those in Singapore and the USA, pay attention to the cleanness of the product. This is in line with the statement made by Plotto (2002) who mentioned that many ginger importing countries nowadays demand cleanliness specifications rather than the quality of the spices. In order to fulfil the required quality standard for the pesticide-free fresh ginger, the exporter takes responsibility for collecting ginger from the farm into the factory, sorting and grading, washing and cleaning, and finally drying and packaging, prior to export or passing to the importers in overseas.

Holleran *et al.* (1999) advised that value-added activities are highly focused on safety and quality of the products. In recent years, enhancing the health benefit of fresh produce have made the growers and processors do value-creating to these health-oriented markets such as the USA and the EU that can pay higher prices for healthy and high quality products (Cisneros-Zevallos, 2003). It seems that the actors in the conventional fresh ginger value chain, particularly farmers, have not focused on quality and safety of the product because they sell their ginger at local and regional markets like Bangladesh that demand low requirements at a low price. Hence, there have not been incentives for the farmers to do value-added activities. In contrast, the actors in the pesticide-free fresh ginger value chain have focused on quality standards since the ginger has been exported to the USA market which pays attention to the quality and safety.

Fulton (2003) stated that farmers, nowadays, are creating producer alliances and investing in value-added activities. Although there are ginger producer groups created by Winrock International in the Myanmar fresh ginger chains, these groups are not operated very well yet. Most ginger farmers have been selling their products individually and harvest their ginger

several times per season depending on the farmers' cash requirements and, consequently, giving them less marketing power. When compared to the farmers in Australia who market their vegetables and fruits in bulk, they can have more marketing power. Contrary to Myanmar smallholder farmers, the farmers in Australia sell their products in bulk while enjoying more marketing power (Duarte Alonso & Northcote, 2013). Likewise, if the ginger producer groups perform well and sell their products collectively to either traders in the conventional chain or directly to the exporters in the pesticide-free fresh ginger value chain, the marketing power of the ginger farmers could also be stronger in Myanmar.

According to Buhr (2004), value-added producers may achieve higher prices through branding and promotion, as these kinds of producers are seeking to differentiate their products from other products in the market. In Myanmar, although branding has not yet been done in the ginger sector, it is likely to be found as either organic or Global-GAP ginger from Myanmar since the exporter in collaboration with the farmers are currently trying to produce the ginger by using the sustainable production method. Webber and Labaste (2010) stated that value-added standards allow the producers to enter into niche markets. For example, coffee produced by Rainforest Alliance standards appeals in many coffeehouses in the USA.

5.5.3. Governance structure of Myanmar current fresh ginger value chain

According to Williamson (1985), there are three kinds of governance structures. One is purely spot market, the second one is vertical integration and the last one is a combination of these two forms such as contract and partial ownership. The conventional fresh ginger value chain in Myanmar is based on the first type of governance structure, which is a spot market. All buying and selling between the actors are based on the spot market. Although the risk is high in spot market, particularly for the farmers due to high price fluctuation of fresh ginger, the farmers interviewed prefer that kind of market as they have been using the spot market for a long period of time since their ancestors. Additionally, the 2018-2019 ginger season has made the farmers prefer the spot market due to high demand from the export market, creating a higher price in the spot market. As this market has been the method of practising in the traditional value chain, it has come to be considered the common form of that type of value chain. Small farmers also prefer this type of market as quick cash transactions can be made, and electronic transactions are not popular in Myanmar.

The second type of governance structure, which is vertical integration, can be found among the participating actors, in some aspects. Although it is not a purely vertical integration, ginger farmers get some kind of support from traders such as cash advances or fertilizer on credit and such activities can be considered as features of vertical integration. A partial form of vertical integration can be seen between the agent and the exporter who exports fresh ginger to Bangladesh. Similarly, the traders, wholesalers and retailers have some form of vertical coordination in which the actors have arranged the price and quality which is convenient for each other. Thus, it can be interpreted that there is very strong vertical integration at the downstream level.

The third type of governance structure, which is contract and partial ownership, is not yet found in the Myanmar fresh ginger value chain but it has high potential to be found in the future because the exporters and some ginger farmers wish to make contract farming for production and exporting of Global-GAP or organic ginger. However, the exporters mentioned that " *it might take some time to see the third form of governance structure in Myanmar fresh ginger chains as the contract farming is a very new concept for the farmers and the farmers do not wish to try new concepts assuming that risk may be high in that kind of governance structure*" .

In the governance structure of global value chain, the role of lead firms or parties play a major role with respect to information exchange, pricing, requirements on quality, quantity and delivery time (Trienekens *et al.*, 2018). It looks like exporters are the leaders in the Myanmar fresh ginger value chains as they share the information such as price, quality, quantity and delivery time to their respective actors, particularly to the agent in the conventional chain and the farmers in the pesticide-free fresh ginger value chain. The exporter also provides the knowledge on the post-harvest process to farmers to understand the activities after the production stage. The governance which emphasizes both power relations of the actors in the chain and the institutions which influence and use the power they hold, is one of the prominent features in value chain analysis (Gereffi *et al.*, 2001).

5.5.4. Power

Ito and Zylbersztajn (2018) said that power plays a critical role in the choice of vertical integration in the value chain. In Myanmar fresh ginger value chains, it was found that

farmers acquired power to negotiate the price with traders utilising the recent communication tools such as the mobile phone along with the support from NGOs like Winrock International. A ginger case study conducted in Myanmar by ILO in 2018 showed that about 40-50% of ginger farmers in Southern Shan State own cell phones (Boquiren & Villaroel, 2018). Interviewed traders mentioned that current farmers have the awareness of demand and supply concept, enabling them to negotiate the price with the traders.

Kirsten and Sartorius (2002) stated that access to market information by the farmers and bargaining power with the buyers could be increased by making contract farming and participation in cooperatives or associations. The authors added that the market power of the firms can also be increased by doing contract farming with the producers, by which the firms acquire large control over the production and distribution of the products. In the current Myanmar pesticide-free fresh ginger value chain, although contract farming has not been practised yet, it could happen in the coming years as discussed in previous sections of this report. Through this activity, market access and bargaining power of the farmers as well as the market power of the exporters could be increased. Renard (2005) also advised that a firm has the power over the organization of the commodity chain and its production process if it applies the certification's norms, controls, premiums and penalties. That kind of power is likely to be found with the exporter who exports pesticide-free fresh ginger to the USA market as the exporter is planning to obtain the Global-GAP certificate in collaboration with the farmers. Therefore, the exporter could have power to control and manage the production process.

5.5.4.1. Trust

Generally, trust is defined "as an expectation that the trustee is willing to keep promises and to fulfil obligations" (Pivato *et al.*, 2008, p. 6). It is crucial in a business relationship to understand each other, especially when the one who trusts is in a vulnerable position (Pivato *et al.*, 2008). In the current Myanmar ginger value chains, it was found that there was a high level of mutual trust between the traders and agent, as well as between the agent and the exporter who export to the Bangladesh market. The exporter also mentioned that he can buy ginger directly from the traders but instead of that, he has been buying ginger from the agent who offers a higher price than the traders as there has been a mutual trust between them over the past five years. At that time, other agents sold to the exporters who gave higher prices,

but the agent was loyal and did not sell to others. The agent sold to the exporter with the agreed price before the ginger harvest season. Since then, the agent and exporter have been working together and arranged a price which would be convenient for both of them. Similarly, trust level is very high between the exporter in Myanmar and importers in Bangladesh due to their long-term relationship.

It is stated that trust serves as a cohesion or cement to hold the relationship of the people in agribusiness firms to achieve business goals (Wilson, 2000). In the case of Singapore export, although it has been about seven years of relationship, the trust level is weak between the exporter in Myanmar and importer in Singapore. The whole process of buying and selling is based on the price and quality rather than relationship and trust between them. The exporter cannot even make an estimated export volume per year unlike the exporter in the Bangladesh market.

With respect to the traders and farmers, although there has been a long term relationship between these two type of actors, trust among them has not yet been found. Farmers mentioned that they have to do price negotiation with the traders because they believe that the price offered by the traders is always lower than the market price. This is inconsistent with the literature reported by Friman *et al.* (2002) who stated that trust may be developed if the business partners interact repeatedly with each other.

Hence, it can be interpreted that trust is high at the downstream level especially at traders, the agent and the exporters in the case of the conventional fresh ginger value chain. Nevertheless, the trust between the pesticide-free fresh ginger exporter and farmers cannot be interpreted yet due to the short period of their relationship and having a coordinator between them like Winrock International.

5.6. Constraints faced by the actors in Myanmar fresh ginger value chains

Based on the value chain analysis framework developed by Trienekens (2011), the constraints faced by the value chain actors in Myanmar fresh ginger value chains can be presented in three components: market information and access, resources and physical infrastructure, and institutional voids.

5.6.1. Market information and access

The majority of ginger farmers in Myanmar have been able to access market information, particularly for price and quality, with the development of communication materials and social media, such as Facebook, which are being utilised as a platform for dissemination of market information by the companies and NGOs. The farmers also get the market information, particularly price, from friends and neighbours in the villages. In recent years, the farmers made phone calls, in advance, to the traders before they sold in search of price information. It is stated that the mountain farmers, particularly in the Hindu Kush-Himalayan region, face a number of constraints in agriculture production and marketing due to a low volume of production by small-scale farmers, inadequate market information, limited access to credit and weak bargaining power (Pandey *et al.*, 2011; Choudhary *et al.*, 2013;). However, observation in this study suggests that even though most of the ginger farms are also located in the hilly region of Myanmar, which is Southern Shan State, their access to market seems to be not as difficult as similar smallholder farmers in other Hindu Kush-Himalayan region, as reported above. The major constraint faced by the ginger farmers in Myanmar is the difficulty of acquiring the quality required by the market. Quality for the fresh ginger in this study means the level of chemical residues, particularly herbicide residues, size of rhizome and cleanness of the products which are demanded by the buyers in high price markets such as the USA and the EU.

Since Myanmar ginger is normally sold in local markets and Bangladesh as a main export market where quality is not a strict criterion, the farmers have not yet focused on the quality. In terms of requirement by the high price market, most farmers have an awareness, however, changing the cultivation practices to meet the requirements are difficult for them since they have been using the traditional practice for over a few decades. For example, about 90% of ginger farmers in Myanmar spray herbicides as a control measure for weeds, whereas the USA and the EU markets pay attention to the residues of herbicides. As mentioned in the ginger production section, the cost of spraying herbicides is ten times cheaper than the hand weeding cost and, thus, changing the weed control measure from spraying herbicides to hand weeding takes time and is more costly for the farmers. Additionally, there have not been enough incentives for the farmers to change their agriculture practices which aim for the production of high quality ginger. In other words, additional remuneration for switching to

pesticide-free fresh ginger should be tantamount to the increase of cost of production in favour of new crop management practices for ginger cultivation.

In terms of credit access, the majority of ginger farmers have access to microfinance organizations, but some farmers are not willing to take the credit from those organizations due to unpleasant past experiences. Some exporters also faced difficulties in accessing credit and making it difficult for them to perform the business of exporting fresh ginger effectively. One exporter said that " *Being a small business under a less developed of banking system in the country, we have been facing difficulties to access credit facilities for payment in advance to the farmers and it is negatively affecting our business"*. Factors such as limited access to credit, low technical knowledge and poor coordination mechanisms among the actors involved have caused poor performances in the value chains. Because of a lack of mechanism for commitments, the pesticide-free fresh ginger exporter has not been able to export the projected ginger volume in time. Apart from that, lack of trust among farmers and traders has created a situation that required ginger farmers to bargain with the traders each and every time they sell their ginger.

Those findings in this study are quite similar to the constraints that have caused market failure of African agriculture markets. They are lacking an enabling environment (unstable macro-economic environment, weak property rights and contract enforcement), barriers to entry (lack of access to capital, technical aspects, market information, high fixed costs or risks) and coordination failures (asymmetric information, no mechanism to enforce commitments, lack of trust) (Poulton & Macartney, 2012).

As already mentioned, only 40 % of ginger is consumed locally while the rest of the production has to be exported because the local market is not sufficient to consume all the production. There have been certain years in which an oversupply of fresh ginger was seen in the local markets, causing waste at the actors' level, especially for the farmers. Those observations are quite comparable to the observed constraints faced by the smallholder farmers in the agribusiness value chains in the Limpopo Province of South Africa in which factors such as insufficient fresh produce markets which lead to an oversupply of fresh products in the market, lack of crop-harvesters and scarcity of land to expand the production have contributed to the weak agribusiness value chains in the region (Baloyi, 2010).

Regarding the power of bargaining, the farmers in Kalaw township have stronger bargaining power with the traders compared to those in Hopong township. The stronger power acquired by the farmers in Kalaw could be associated with their nature of application of higher inputs like fertilizer, decomposed cattle manure, weed control and more professionalism in cultural practices in ginger production, getting better quality produce. Ginger farmers in Kalaw township also have better market access due to its geographical location being closer to a main trading city, which is Aungban. Moreover, Kalaw township has more access, shorter distance and easier transportation to the other major markets in Myanmar like Yangon and Mandalay. The distances from Aungban in Kalaw township to Yangon and Mandalay are 259 miles and 95 miles respectively, while the distance from Hopong to Yangon and Mandalay are 278 miles and 105 miles respectively. As ginger is not a major cash crop in Hopong township, unlike the Kalaw township, the use of farm inputs level is less, causing poor quality and low yields. Additionally, the traders also said that ginger quality in Hopong township is poor when compared to that of Kalaw township. Owing to all these factors, ginger farmers in Hopong township have poor bargaining power, receiving lower prices than those in Kalaw township.

At the exporters' level, the exporter who exports the fresh ginger to Singapore negotiates price with the buyer in Singapore. Additionally, there are some cases of the ginger not being exported due to disagreement between the exporter and importers. In terms of requirements by the overseas markets, all fresh ginger exporters understand the requirements, however, some failed to meet those requirements. A major problem faced by the exporters is the development of fungal infections on fresh ginger during transportation. Since cleaning and washing of fresh ginger were carried out by the exporters before the product is shipped, and the transportation period takes 30-45 days in the case of Bangladesh and the USA market, fungal attack on fresh ginger has occurred during this period. The exporter who exports to the USA market said that " *fungi were found in the first time trial shipment but the buyer did not take any actions because this is the trial shipment but the buyer will definitely take an action in the case of large volumes*". Similarly, the exporter who exports to the Bangladesh has no awareness of fungus control method on fresh ginger during the shipping period.

Price fluctuation of fresh product is a major constraint, which has been faced by many actors, particularly farmers, traders, exporters, wholesalers and retailers. It is stated that price volatility is a normal feature of the agriculture product markets, however, greater uncertainty

is an unfavourable factor for the actors (Tothova, 2011). One trader also advised that he lost approximately US$ 45,000 from ginger trading in 2017-2018 ginger season due to high fluctuation of the market price. The local market price was around US$ 0.2-0.60 per viss five years ago and it was US$ 0.46 per viss at the beginning of the 2018-2019 ginger season. The price then goes up gradually and it was around US$ 0.78 per viss in early 2019. Tothova (2011) mentioned that there are some underlying factors that caused the price volatility of agriculture products. They are low level of stocks, climate change and weather-related events, government policies, strong co-movements with energy and other agricultural prices. In the case of Myanmar fresh ginger value chains, these factors could not be the main reasons of price fluctuation. Export demand seems to be the main reason of price fluctuation because 60% of fresh ginger production has to rely on the export market, meaning that the higher the export demand, the higher the price and lower demand causes a lower price in local market. However, climate change and weather-related events in other major ginger growing regions of the world would invariably influence the export demand of ginger from Myanmar.

The impact of high price fluctuations has also been suffered by the exporters. In the 2018-2019 ginger season, prior to the commencement of harvest, there was an agreement that farmers would sell their ginger to the exporter who exports to the USA although not an official agreement. Nevertheless, when the ginger harvest season started, farmers who initially agreed with the exporter did violate the prior agreement and sold their harvested ginger to traders in the town. The reason was said to be because of the high price in the local market and no requirements in terms of rhizome size and pesticide residues etcetera. As a result, the exporter who planned to export 120 tons of fresh ginger to the USA market could only export about 8 tons in 2018-2019 season as already presented in ginger export section. From the exporter's side, it did not expect that the local price would increase up to US$ 0.78 per viss in the near future and, hence, made an agreement with the buyer in the USA to export 120 tons of fresh ginger. According to the traders who were interviewed, the high demand for fresh ginger by Bangladesh in the 2018-2019 season is due to a low yield in India caused by flooding, meaning that India cannot supply the ginger to Bangladesh. This situation is in agreement with the underlying factors, namely the climate change effects for price volatility of agricultural products reported by Tothova (2011) .

Another constraint for the exporter is the unstable currency exchange rate in Myanmar, which could have a big impact on business performance. The exchange rate is regarded as an

indicator of competitiveness of any currency of any country and an inverse relationship between this competitiveness exists (Danmola, 2013). Daniels *et al.* (2013) defined that exchange rate is the price of a currency, especially the number of units of one currency that buy one unit of another currency. It can change daily and there are many ways to have less impact from an unstable currency exchange rate (Daniels *et al.*, 2013). One exporter said that he lost around US$ 55,000 in the 2017-2018 season due to the high fluctuation of the exchange rate. When the exporter made the price agreement with the buyer in Bangladesh in late 2017, the US dollar price in the local market was high, but the price was low when he received money from the buyer after the product was shipped to the final destination in early 2018. The exporter said " *It is really hard for the exporter in Myanmar to make a contract with the buyers in overseas since the exchange rate in the country in recent years has been fluctuating a lot*". A study on exchange-rate volatility and foreign trade in thirteen LDCs found that there is a negative and statistically long-running relationship between the exchange-rate volatility and export flows. Additionally, the exporters in these countries do not usually use any measures of exchange rate volatility (Arize *et al.*, 2000). This is consistent with the case of exporters in Myanmar who have never used and may not have the knowledge to use the mechanisms to have less impacts by the unstable currency exchange rate.

The Figure 5-8 shows the exchange rate of US dollar to Myanmar kyat in 2017 and 2018.

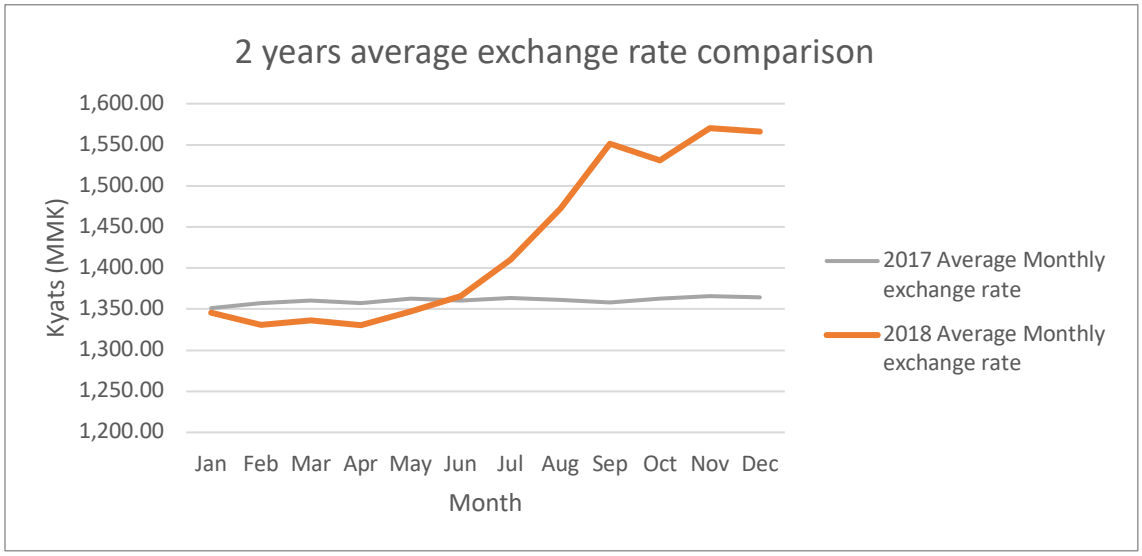


Figure 5-8: Exchange rate of US dollar into Myanmar kyat in 2017 and 2018 in Myanmar

Source: Central Bank of Myanmar (2019)

According to Daniels *et al.* (2013), the mechanisms, namely, forward contract, foreign currency future contract and a put option could also be used to lessen the impacts of an unstable currency exchange rate.

Forward contract: In this type of contract, the firm make a contract with a market maker bank, which could be an international bank, that will quote the exchange rates today at which the firm and the bank will carry out these forward agreements. The bank will state the foreign currency price that they buy and sell in a specific time frame (usually a month). The firm knows exactly what the local currency is equivalent to a fixed amount of foreign currency based on the current situation. In this contract, the agreement is that the exporter will receive the fixed amount of foreign currency in the future, regardless of any increase and decrease in the price of foreign currency. This method is useful when the currency in the contract is weaker in the future.

Foreign currency future contract: In order to do purchasing of a future contract, a company or exporter works with exchange brokers. In the contract, the specific amount and time frame required by the company is given. It is useful for speculators and small companies that cannot make a forward contract.

A put option: In this type of contract, the firm makes an agreement with a bank to sell 1) a specified amount of foreign currency at 2) a specified future date and at 3) a specified price, all of which are set today. This option provides the firm with a floor price for the foreign currency which is expected to be received in the future. However, the firm will not get advantages in the case of a favourable exchange rate but it protects the firm from an unfavourable exchange rate.

5.6.2. Resources and Physical Infrastructure

5.6.2.1. Geographical and transportation constraints

Some farmers in the Hopong township whose farms are located far away from the main road have faced the difficulties of transporting their farm inputs into the farms and products from the farms. One ginger farmer said that "*I use a motorcycle sometimes to transport the inputs*

into the farms due to the narrow path of the road which is not accessible for trucks". Thus, the farmers have to spend a lot of their time to transport the inputs to the farms. The higher the transportation cost at any level in the chain makes the price higher for the customers since wholesalers and retailers in Myanmar set the price by adding transportation cost, labour cost and some amount of money as a profit into the price they offer the suppliers.

A few authors (Pandey *et al.*, 2011; Choudhary *et al.*, 2013;) reported that the constraints faced by the mountain farmers, particularly those in the Hindu Kush-Himalayan region, are geographical constraints, due to their remote areas and poor physical and resource infrastructure which, in turn, leads to high transportation costs for the farm inputs and products. Similarly, research on an analysis of constraints faced by smallholder farmers in the agribusiness value chain in the Limpopo Province of South Africa also found that transport, low volume, poor quality product, lack of collective works by the farmers and geographical constraints cause high transaction costs for the farmers and inconsistency in production and marketing (Baloyi, 2010). In general, findings of the current study on the value chain of ginger are also comparable, to some extent, with the physiographical features of the hilly region of Southern Shan State where ginger is grown by the smallholder farmers.

Improper transportation leads to big losses of ginger due to damage to the product and this finding of the Myanmar fresh ginger value chain is similar to the explanation reported by Salami *et al.* (2010). The author reported that underdeveloped rural roads and other major physical infrastructure in developing countries have caused higher transportation costs for agriculture products to the market and inputs to the farms. About 10-50% of ginger is damaged and losses are high at wholesalers and retailers' levels due to improper transportation methods such as putting a few layers of ginger sacks on top of each other in an overloaded truck. Driving on poor roads with an uneven surface along the journey contributes to those losses. The exporter who exports fresh ginger to the USA explained that about 50% of ginger is damaged and broken during transportation from farm to the factory although they do take care about the transportation process. The damaged gingers are sold at the local market at the lowest price.

5.6.2.2. Human resource and technical constraints

The ginger farmers in the study area, particularly those in Hopong township, have faced difficulties in finding labour requirements as mentioned earlier. The farmers in this township sometimes have to harvest the ginger a week before selling depending on the availability of labour and, hence, the associated weight loss is higher than those in Kalaw township. According to a farmer interviewed, approximately 4 -10% of weight loss is found during the storage period of a week.

According to a study on socio-economic aspects of ginger producers in western hills of Nepal, the problems faced by the farmers were input supply, and insufficient technical knowledge on plant protection measures during production stage and storage period (Poudel *et al.*, 2015). Since Myanmar and Nepal both have similar socio-economic features as well as available resources, the constraints faced by the farmers in these two countries are very similar.

Another problem faced by the ginger farmers in Myanmar is unavailability of technology as a part of output from a formal research and development program, particularly a technical support from Government authorities like DOA. As ginger is a non-priority crop in Myanmar, this could be the reason for less attention from the government organizations. In the past two to three years, ginger farmers experienced some serious diseases like bacterial wilt as well as Fusarium stem rot on their ginger crops, causing a nearly zero harvest in certain serious cases. One farmer said that " *I invested about 5,000,000 MMK which is equivalent to US$ 3,220, for per acre of ginger in the 2018-2019 ginger season. But I did not collect any harvest due to the disease problem even with very hard efforts made for control and manage the disease*". In the case of ginger disease incidences, ginger farmers usually depend on advice from the sale representatives of agrochemical companies for suitable disease control methods, but the motivation of these sales representatives is promotion of their products in the villages. The farmers interviewed advised that "*the pesticides or fungicides recommended by the salesperson cannot solve the problems in many cases and even more serious in some cases*". Moreover, the majority of ginger farmers use herbicides to control weeds and, consequently, they have been faced with the decline in soil biological fertility that is attributed to the residual effects of the herbicides which have been used continuously for many years.

5.6.2.3. Financial constraints

According to Freeman *et al.* (2006), the constraints faced by the smaller global firms are lack of economies of scale, very limited financial and knowledge resources and a strong disinclination of risk taking. It is also stated that medium and small enterprises (MSEs) in developing countries tend to face greater financial constraints than larger firms (Nichter & Goldmark, 2009). The constraints stated by these authors and the first two constraints reported by Freeman *et al.* (2006) are visible with certain exporters in the Myanmar fresh ginger value chains and, for example, the exporter is unable to make a cash advance to the suppliers or farmers. They are also unable to support the farmers, even technically, for the sustainable production and transportation of ginger in either Global-GAP or organic program. The exporters interviewed mentioned that they do fresh ginger exporting business which has a high risker than exporting processed ginger, however, they like to take a risk and that means a third constraint, which is a strong disinclination of risk taking is contradictory with the findings of this study. For example, the exporter to Bangladesh lost US$ 55,000 in 2017-2018 ginger season but the exporter continues the business the following year. It means that the Myanmar fresh ginger exporters have not been too concerned to take a risk and the risk-seeking behaviour may be due to regional experiences of high variability of losses as well as profit margins in the Bangladesh market.

5.6.2.4. Logistical constraints

On the other hand, lack of logistics, such as cold chain facilities, is also a challenge for the exporters who need to ship the perishable fresh products to the buyers in overseas within a limited time frame. Salami *et al.* (2010) stated that unreliable and expensive electricity in rural areas of developing countries have reduced the investment in cold chain facilities and, consequently, it leads to difficulties in maintenance storage life of perishable products. Nevertheless, electricity is not a reliable and stable source in both rural and urban areas of Myanmar and, therefore, most farmers in Myanmar have never heard of, or experienced, storing their agricultural products in refrigerated rooms. Although Salami *et al.* (2010) quote the unreliable electricity supply as a threat for agribusiness value chain in developing countries, the farmers in Myanmar do not think that as a constraint for them. In this context, all the actors in the value chains namely, farmers, traders as well as exporters, almost equally assume that weight loss at storage stage is a normal phenomenon for them. One trader

mentioned that about 20% of weight loss had occurred during the storage period of a month, particularly for early harvested ginger which has higher water content.

Figure 5-9: Storage of ginger at trader's warehouse in Aungban (left) and at wholesaler's warehouse in Yangon (right)

Apart from that, the transportation cost is also high as the products have to be shipped via the Singapore port. For example, a container which allows 26.5 tons of fresh ginger costs US$ 2,100 to deliver the product to Bangladesh. In the case of USA export, transportation time takes 30-45 days for the product to reach its final destination. Therefore, maintaining the product's freshness and quality throughout the transportation period is important. In certain years, the exporter received complaints from the importers in overseas markets on fungal infections of ginger. The current exporters of the Myanmar fresh ginger value chains seem to be unaware of the required technical knowledge resources to prevent the fresh ginger from fungal attack during transit.

Apart from the constraints that have been discussed above, the fresh ginger value chain has also faced a number of challenges to move forward when compared to the processed ginger value chain in the country as the latter has a more organized and systematic market structure. The processor offers a 10% higher than market price to organic ginger during a good market price period and offers a 10% higher than production cost during a low market price situation. However, a similar mechanism has not yet been found in the pesticide-free fresh ginger value chain. Poulton *et al.* (2006) stated that the challenges faced by the African export cash crop sectors are 1) to maintain and enhance product quality 2) to arrange the

remunerative prices in the case of low and international price fluctuation 3) to find ways of delivering seasonal finance to producers and 4) to ensure high quality research and extension support for high and quality production. These findings of Poulton *et al.* (2006) suggest that the challenges faced by the Myanmar fresh ginger sector and African export cash crops' sector seem to be almost similar because of the similar economic situation and available resources of Myanmar and many African countries.

5.6.3. Institutional Voids

In Myanmar ginger sector, ginger farmers are not able to participate very actively in their value chains, partly due to weak institutional voids. Being a non-priority crop, ginger sector has not been paid much attention by the government sector, making the actors, particularly farmers and exporters, face difficulties in production and exporting of fresh ginger. Nevertheless, the actors who were interviewed mentioned that they feel that there is no impact on their business by the government policies and ethical standards. For fresh ginger export to any country except border trade, phytosanitary certificate is a compulsory requirement and the required certificate is issued by the Plant Quarantine section, which is a section under the Plant Protection Division of Department of Agriculture. The application process normally takes three to five business days and the application fee is 30,000 MMK (US$19.6) for one application. It seems that the institutional void is not a big constraint for the fresh ginger value chain in Myanmar. Nevertheless, according to Mair and Marti (2009), people in developing countries are not able to participate in markets due to their weak "institutional voids"- situations where the institutional arrangements that support markets are weak, absent and fail to accomplish their role.

5.7. Opportunities of Myanmar fresh ginger

According to the information collected, the major opportunities of Myanmar fresh ginger lies in three categories, namely production, exporting, and increasing number of processors and food industry.

5.7.1. Production

The farmers interviewed mentioned that ginger is a crop that rarely loses its profit. The yield of ginger in the study area is normally four to ten times of its seed rate depending on farm inputs, production techniques and weather conditions. The majority of ginger farmers sourced

seed rhizomes from the previous year's harvest and did not need to buy, and use family labour, leading them to have low production costs, suggesting the possibility of generating a competitive price in the world market. Additionally, there is high demand for value-added products such as fresh ginger produced by the Global-GAP or organic method (Temu & Temu, 2005). As mentioned by the importer in the USA, the Global-GAP and organic ginger gets a premium price of 10% and 30% respectively over conventional fresh ginger. This creates a great opportunity for producing the kinds of ginger because the majority of ginger farmers in Myanmar practise crop rotation and fallowing. Additionally, one of the best incentives for the farmers to focus on is the quality aspect, which has never been given attention by the farmers.

Ginger value chain analysis in Nepal showed the one opportunity for the Nepal ginger sector is a high demand for quality ginger seeds by the farmers (ANSAB, 2011). This finding differs from the findings of the Myanmar fresh ginger value chains in which ginger farmers do not buy the quality seeds but, instead, source from previous crops. This could be that Myanmar does not yet have any commercial farms that produce the seed rhizomes. As presented in the role of NGOs' section, Winrock International has supported some of the ginger farmers to produce commercial seed rhizomes. Hence, it is expected that demand for quality seeds could be higher if Myanmar has that kind of seed farms through which, the farmers might focus on the use of quality seed rhizomes.

A certification body in Myanmar mentioned that the acquisition of Global-GAP as well as organic certificates for Myanmar ginger may be less rigorous and shorter in time requirement since the level of agrochemical utilization by Myanmar farmers is less than compared to the farmers in neighbouring countries such as India, Thailand and China. In fact, soil is less contaminated and it would be an added advantage to produce either Global-GAP or organic ginger in Myanmar. Moreover, about 6,000 ginger farmers have been already provided with the required technical packages by Winrock International for production of Global-GAP and organic ginger. According to a case study analysis conducted by the ILO in 2018, Myanmar is the seventh largest ginger producer in the world, and it is suggested that there is high potential to create a competitive market in the world (Boquiren & Villaroel, 2018). These factors appear to be complementary for Myanmar farmers to become a substantial producer-cum-supplier of Global-GAP or organic ginger, which might increase farmers' income as well as living standards.

5.7.2. Exporting

Salami *et al.* (2010) point out that an increasing trend in global demand in developed and developing world, which is driven by the population growth, has created opportunities for the smallholder farmers, especially in developing countries. World demand for ginger is also increasing as already mentioned and, therefore, an opportunity could also be created for the Myanmar ginger sector. The exporters who were interviewed also said that the buyers in overseas prefer Myanmar ginger due to less use of agrochemical materials, in general, when compared to other countries in Asia. Moreover, it was mentioned that Myanmar fresh ginger usually contains less water in the rhizomes when compared to Chinese ginger, which allows for some time to lose net weight. Consequently, it extends its shelf life, which is a preferred characteristic by the buyers. Furthermore, the importers mentioned that the yellow variety organic ginger would be popular in the future in the international market. This could create another great opportunity for the Myanmar ginger sector since farmers in Myanmar also grow that variety. Additionally, with the export tax of only 2% by Myanmar government and zero tariff on the raw materials imported from developing countries, particularly LDCs like Myanmar by the EU and the USA markets, would create a possibility for Myanmar fresh ginger to enter into these high price markets with a competitive advantage.

Similar research on the analysis of opportunities of smallholder coffee farmers in developing countries showed that a direct link between the farmers and end markets could help the farmers to understand the market requirements, adapting the practices in order to meet those requirements and then achieving a competitive advantage by making product differentiation (Borrella *et al.*, 2015). A similar kind of situation seems to be emerging in the Myanmar pesticide-free fresh ginger value chain in which there is a direct link between the exporter and the farmers while also developing agricultural practices to meet the market requirements. Moreover, the importer in the USA also mentioned that they are willing to invest in the Myanmar ginger sector. If this could be implemented in Myanmar, there will be a direct link between the farmers and the end market, creating more opportunities for Myanmar fresh ginger to meet the required quality of the high price markets.

5.7.3. Increasing number of processors and food industry

The export-led growth strategies by developing countries has drawn attention to food processing sectors, especially at the time of crisis in exporting the traditional fresh commodity (Wilkinson, 2012). It is also stated that the transformation of the agri-food industry, which includes processing, has taken place in developing countries over the past 50 years (Reardon *et al.*, 2009). There are a number of local processors, food industry, and processors-cum-exporters in Myanmar who make and export a number of processed gingers such as dried ginger, sliced ginger and ginger powder to the high price markets such as the EU, Australia and the USA. Since these actors are engaged in the processing of ginger, the size of the rhizome is immaterial, suggesting that there is a sufficient market for the damaged ginger portion resulting in poor transportation facilities and improper handling methods. One processor-cum-exporter, who was interviewed, has exported about 150 tons of processed ginger including sliced ginger, dried ginger and ginger powder per year to the USA, Australia, and the EU markets, particularly Germany and the Netherlands. Another processor-cum-exporter has also exported about 60-80 tons of dried sliced ginger per year to the EU markets through Sri-Lanka.

Reardon *et al.* (2009) stated that a growing number of processed food export by the developing countries has accelerated in the decade of the 1990s due to foreign direct investment in the sector. As an example in Myanmar, one foreign company from Sri-Lanka has invested in processing organic ginger since 2014 and the rest of the processed ginger exporting business is owned and operated by local companies. A growing number of food processing industries have reduced the wastes of seasonal food like fresh ginger (Reardon, 2015). The fresh ginger exporter who was interviewed also mentioned that they are happy to have a ginger processing business in Myanmar because they can sell the damaged and broken ginger to those processors. Additionally, certain exporters also planned to establish a ginger processing factory in order to make sure that there is also a good market for the broken rhizomes, enabling them to export the fresh ginger effectively with lesser operation costs when compared to doing fresh ginger export business only.

Apart from exporting processed ginger, there are local processors who make ginger stripes for the shops to make and sell as pickled ginger. In Myanmar, pickled ginger is a main ingredient for making ginger salad, which is a popular food in many parts of the country. In

this case, the processors buy the cheapest ginger as quality is not a criterion but the price is. The food industry such as roasted sunflower seeds, fried beans, potato chips and preserved plum business that operate their business over the whole year, source the smallest ginger at lowest price. A growing number of these businesses in Myanmar have provided a guarantee for the fresh ginger export business that there is also a good market for the damaged and small ginger that drops out from the processing path.

5.8. Value Chain Upgrading

Humphrey and Memedovic (2006a) state that upgrading plays an essential role but not an optional extra one because it is a requirement in order to get the continued access to a rapidly changing global market. Based on the Trienekens (2011), there are three types of upgrading strategies: upgrading of value-added production (process upgrading, product upgrading, functional upgrading and intersectoral or chain upgrading), upgrading of value chain-network structure and upgrading of governance. The author also said that process and product upgrading are the most common forms and the other two forms in value-added production are rarely found in developing countries' value chains. In the current Myanmar fresh ginger value chains, however, three kinds of upgrading namely, process, product and functional upgrading were observed and they are discussed as follows.

5.8.1. Process Upgrading

Process upgrading is defined as the upgrading strategy to transform the inputs into outputs, making them more efficient through better technology or modifying the production system (Gereffi *et al.*, 2001). According to a description by FAO (2003), the practice in Global-GAP which promotes production standards and storage of agricultural products is a kind of process upgrading. Trienekens (2011) elaborates that process upgrading involves focusing on two things: One is upgrading the product, and the other is the optimization of production and distribution process, which involves introduction of new technologies in production and packaging lines, installation of cooling systems and modern transportation technology as well as improved communication facilities such as mobile phones and internet connection.

In the current Myanmar fresh ginger value chains, neither Global-GAP or organic ginger production protocol has yet been fully implemented. Nevertheless, the current production of

pesticide-free fresh ginger in operation can be considered as a preparatory stage for Global-GAP and organic ginger. As discussed in the constraints' section, the major constraints faced by Myanmar farmers are weed control measures and the disease problems in achieving those certificates. It is suggested that shifting the planting dates to cooler periods of the year may reduce or prevent the bacterial wilt disease. Since the disease is soil-borne, and can survive for a long time in soil, water and plant materials, it is important to clean seeds, soil, water and tools. The use of healthy and disease-free seeds is the most economical, effective and environmentally friendly disease control measure (Wubshet, 2018). It seems that Myanmar farmers do not have an awareness of shifting the planting date to control the disease. Nevertheless, Myanmar ginger farmers make sure to use only healthy seed rhizomes with many buds and large fingers without pest and disease symptoms and have been using their own selection criteria over generations.

Crop rotation with rice and corn is also recommended in many studies, as these crops are resistant to the pathogens of ginger diseases. Additionally, growing ginger crops on soil which has a higher clay content and low pH is one kind of disease control measure as that soil type suppresses the pathogens of the disease (Rai *et al.*, 2018). Although certain cultivation process upgrading efforts have been practised in the Myanmar fresh ginger value chains, it is necessary to create better performances through adoption of novel approaches, particularly towards weed control, disease, as well as possible insect control measures that would be acceptable by global certification bodies in the near future.

5.8.2. Product Upgrading

Neilson and Pritchard (2009) described that product upgrading is a type of improvement in the quality of a product so that producers get enhanced marketability and premium price. In the case of the Myanmar fresh ginger value chains, traditionally product can be sold only in regional markets such as India, Pakistan and Bangladesh until very recent. Interestingly, exporters in Myanmar acquired the ability to export fresh ginger to Singapore since seven years ago by focusing on product upgrading at post-harvest stage such as sorting, cleaning and washing. As a further advancement of product upgrading, Myanmar ginger exporters commenced exporting fresh ginger over the past two years to other high price markets like the USA and the EU.

Not only the export markets demand quality ginger, but also the local market, particularly Yangon and Mandalay which are the biggest cities in Myanmar demand high grade quality ginger. In the 2018-2019 ginger season, the price difference between the first grade and lowest grade ginger in Yangon market is 600 MMK (US$ 0.39) per viss (1.63 kg). Unlike high price export markets in developed countries such as the USA and the EU which focus on food safety in addition to size of the rhizome, local market focuses only on size, and appearance of the rhizomes, meaning that the bigger the rhizome size, the higher the price is. Therefore, the actors, particularly producers, can get the higher price even in the local market if they focus on product upgrading. For product upgrading, post-harvest management plays a critical role. In the Myanmar fresh ginger value chains, main losses during post-harvest stage are occurring during the transportation and storage period.

In Myanmar, the actors along the chain do not cover the fresh ginger after harvesting and do not use any cushion materials to avoid damage during transportation. Kitinoja and Kader (2002) stated that direct exposure to the sun after harvesting should be avoided as much as possible and field containers should also be placed under the shade or loosely covered with leafy plant materials, straw or an inverted empty container, as good initial post-harvest handling practices. As discussed in the activities performance by different actors section, the farmers, traders and exporters in Myanmar use plastic bags and bamboo baskets as packaging materials. They mentioned that losses by bamboo baskets is lower than that by plastic bags during transportation. A study on fruits and vegetables' handling and transportation in Nigeria regarding the use of baskets and bags as packaging materials, suggested designing plastic containers to reduce the losses during transportation (Idah *et al.*, 2007). In the case of pesticide-free fresh ginger value chain, the exporter has been using the plastic crates for transportation of ginger from the farm into the factory, but the exporter still claims substantial losses during transportation. A case study on the fruit and vegetables sector in Sri-Lanka showed that packaging and transportation losses of mangoes and avocados can be reduced from 30% to 6% by the use of plastic crates. This is because most of the losses during transportation are mainly due to bruising and compression caused by the rough inner surface of the package and by overfilling. Hence farmers and exporters use paddy straw, moss and banana leaves as cushion materials, making little improvement in transport and packaging (Choudhury, 2006).

Another study on recent developments in reducing post-harvest losses in the Asia-Pacific region showed that containerization is the best system to transport the products from one place to another as one of its greatest advantages is that it can be placed on a truck or rail, without having any impact on the produce inside with the movement of the vehicle. In the Malaysia fruit and vegetables' sector, returnable plastic containers have been introduced to the farmers and exporters as a replacement for bamboo baskets for field handling, wholesaling and retailing in order to reduce the post-harvest losses as well as reduce the deforestation as forest conservation. Similarly, in Nepal, plastic crates which can be guaranteed their return and uses are generally used for transportation of fruits and vegetables (Choudhury, 2006). Nevertheless, the containerization and use of returnable plastic containers for transportation have not yet been found in Myanmar not only for fresh ginger, but also for most of the agricultural crops.

With regard to storage, the actors in Myanmar fresh ginger value chains do not use any specific storage facilities and leave the ginger in a warehouse. As a result, all the actors throughout the chains have faced weight loss during storage. Choudhury (2006) noted that storage life is controlled by many factors such as crop variety, stage of maturity, rate of cooling, storage temperature, relative humidity, accumulation rate of CO_2, prepacking and air-distribution systems. It is suggested that rhizomes should be harvested immediately after they mature since premature or delayed harvest can contribute to many ginger quality deterioration phenomena such as shrivelling, weight loss by desiccation, decay, sprouting, discolouration and other physiological breakdown (Afek & Kays, 2010). In Myanmar, most ginger farmers harvest ginger only when they require the cash, causing over-maturity to the ginger in many instances. Ginger rhizomes can be stored in pits covered with sand and dry grass and usually these storage pits are prepared in shady places if the refrigeration is not available (Afek & Kays, 2010). Plotto (2002) suggests that storage rot caused by fungus and weight loss due to dehydration could be prevented by adoption of a combination of bio-controls with Trichoderma species and storage in polyethylene bags at a temperature range of 25-30 ºC. The current study revealed that each actor along the traditional fresh ginger value chain in Myanmar have used neither formal storage facilities nor appropriate technology, resulting in substantial post-harvest losses.

Overall, as the appropriate technologies used by neighbouring countries are not sophisticated and of low cost, it would be possible to also adopt these technologies in Myanmar to reduce

the post-harvest losses and, in turn, better performances of product upgrading could be expected in the fresh ginger value chains.

5.8.3. Functional Upgrading

According to Neilson and Pritchard (2009), function upgrading is the function of value chain actors by altering their position within the chains. In the current Myanmar fresh ginger value chains, this kind of upgrading is found among the exporters who might shift from the role of exporters only into the role of producers-cum-exporters due to the market requirements. The fresh ginger exporter who exports to Singapore is planning to establish approximately 41 hectares of organic ginger farm in the 2019-2020 ginger season following the realization that only Global-GAP or organic ginger would be bought by the buyers in high price markets in the future. Similarly, the exporter who has exported fresh ginger to Bangladesh is also planning to grow organic ginger along with establishing ginger-washing facilities in order to also expand their future markets. The functional upgrading of current Myanmar fresh ginger value chains by these exporters can be illustrated in the following schematic diagram (Figure 5-10) based on the illustration of Kaplinsky and Morris (2001) in a handbook for value chain research.

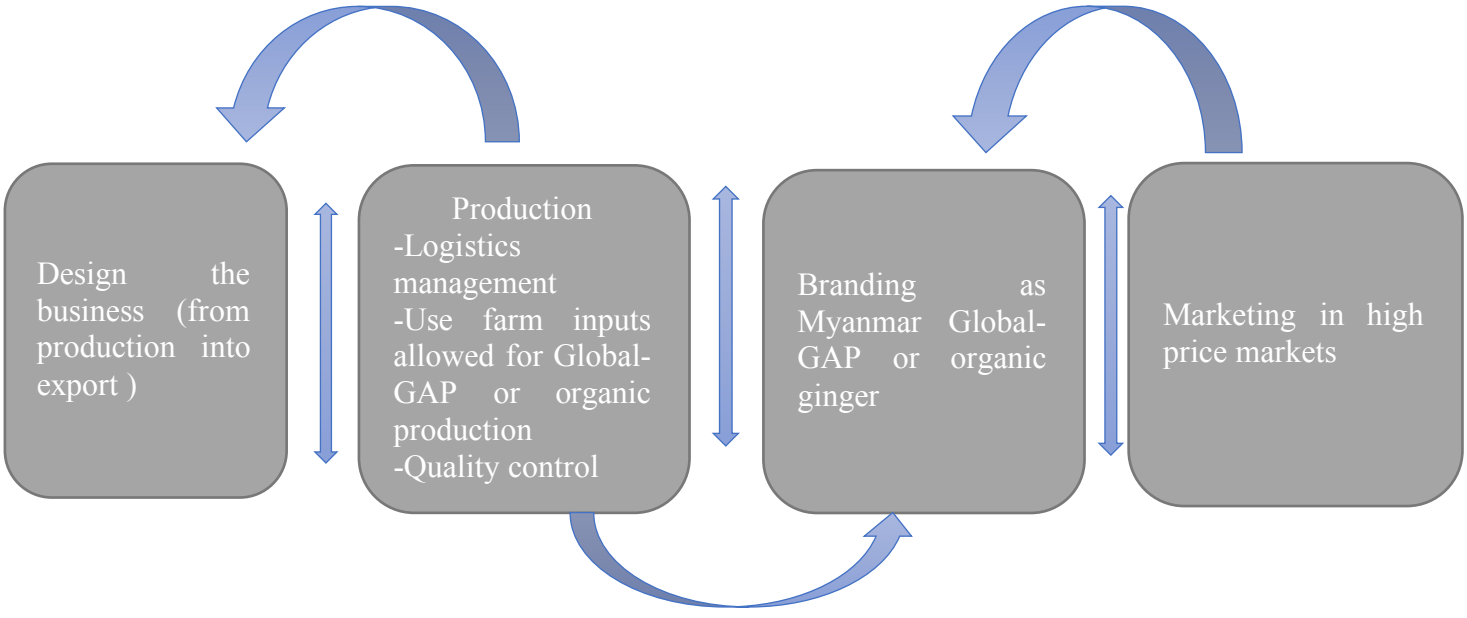


Figure 5-10: Functional upgrading of Myanmar fresh ginger value chains

It is advised that functional upgrading could also take place at the exporters' level by being actively involved in the collection of products, category management, packaging and sales of the products (Dolan & Humphrey, 2000). A comparable upgrading can be seen at the exporter who has been exporting pesticide-free ginger in which the exporter takes responsibilities for the collection of the products from farm into factory, sorting and grading, cleaning and drying, packaging and delivering to the overseas.

Nevertheless, Inter-sectoral or Chain upgrading, which refers to moving into a new value chain has not yet been found in the current Myanmar fresh ginger value chain.

5.8.4. Upgrading of value chain-network Structure

It means upgrading of both horizontal and vertical relationships, aiming to focus on the right market channel (Trienekens, 2011). Roy and Thorat (2008) described that upgrading of the network structure at the horizontal level is done by creating producer associations or cooperatives in many developing countries. It also includes joint purchasing of inputs, production facilities and joint marketing of products (Trienekens, 2011).

In the current pesticide-free fresh ginger value chain, there are ginger producer groups created by Winrock International at the horizontal level. The farmers from these groups have direct contact with the exporter, unlike with the conventional ginger value chain where there are many actors between the farmers and exporters. Nevertheless, most of the groups have not yet operated very well due to the use of herbicides which are not allowed to be used by group members in order to produce the pesticide-free fresh ginger for high price markets like the USA. Because of poor performances of the groups, as yet, there is no collective buying and selling of ginger among the group members.

At the vertical level, increasing coordination between the buyers and sellers in the chain leads to a closer relationship between these two actors by which knowledge transfer and provision of up-to-date and relevant information are received by the participating actors (Humphrey, 2006). Although that kind of coordination has not yet been seen in the current Myanmar ginger value chains, it is likely to be found in coming years. A case study on the impact of the UK supermarkets on the African Horticulture Industry showed that a long-term relationship and vertical coordination between the European importers and African exporters has brought

several advantages, particularly for the exporters, as the importers are taking the leading roles in terms of product development, packaging and presentations (Dolan & Humphrey, 2000). This is contrary to the findings of this study in which there is no support so far from the importers in terms of product development and packaging materials for ginger. The importers just informed the exporters the requirements of their markets. This could be the reasons that the importers do not focus on quality aspects but focus on price in the case of the conventional fresh ginger value chain. Since the business is only two years at trial stage in the case of pesticide-free ginger value chain, the relationship between the exporter and importer is not yet strong and, hence, the importer may not take the leading role for the product development so far.

According to Trienekens (2011), focusing on part of the right market channel is a kind of upgrading of vertical network structure. For example, horticulture products' producers in certain African countries (Kenya and South Africa) have focused on emerging markets in Asia, rather than European markets, due to less demand in terms of quality and safety requirements by the Asia market (Nadvi, 2004). Quite comparably, the observations of this study indicated exporters in Myanmar are focusing on two kinds of market channel. One type of exporter is focusing on regional markets such as Bangladesh and Singapore because of their low requirements in terms of quality, rhizome weight, size and chemical residues with low price. Another type of exporter is the one who has focused on the high price markets like the USA that demands high requirements with high prices.

5.8.5. Upgrading of governance

It is mentioned that, today, market-oriented chains have become shorter due to a direct relationship between the producers and downstream parties in order to meet the requirements by the markets. An example of this is transformation of export-oriented producers into producers-cum-exporters in order to lower the transaction costs and have full control over the supply chain (Trienekens, 2011). It has potential to see that kind of transformation in Myanmar fresh ginger value chains as the exporters are trying to take the roles of producers as well by establishing the organic ginger farms in the near future. Humphrey (2005) stated that value chain governance involves institutions for doing monitoring activities and enforcing compliance. In a case study on fresh vegetable chain in Kenya, the role of governance was linking the Kenyan producers with the UK supermarkets, thereby increasing

collaboration between the producers and retailers (Humphrey, 2005). Therefore, upgrading of governance in the Myanmar fresh ginger value chains context means encouraging or creating the institutions such as Government, NGOs or third parties for monitoring and enforcing the compliance to follow the standards like Global-GAP required by the markets.

In many EU countries, NGOs play a key role in developing traceability protocols in order to gain information on foodstuff movement and by which regenerates consumer confidence in the agri-food system (Renard, 2005). In Myanmar context, it seems that Winrock International has taken the responsibilities of this role under its project "Value Chain for Rural Development". However, this project is going to be terminated in June 2019 and, hence, it is necessary to create a new institution to take that role. In that case, the relationship between the farmers and exporters is critical for the chain which could allow higher profits for both actors and the chain itself since they are working directly. Practising the agriculture methods for the production of Global-GAP or organic ginger by the farmers and monitoring by the exporters in collaboration with government institutions and NGOs in terms of fertilizer application, weed control measure and timing for harvesting are ways of upgrading of governance. That type of upgrading has not yet happened in the current Myanmar fresh ginger value chains but it is expected to do so in the near future.

Based on the diagram illustrated by Trienekens (2011) for value chain upgrading options in developing countries, upgrading options of current Myanmar fresh ginger value chains can be illustrated by the following diagram.

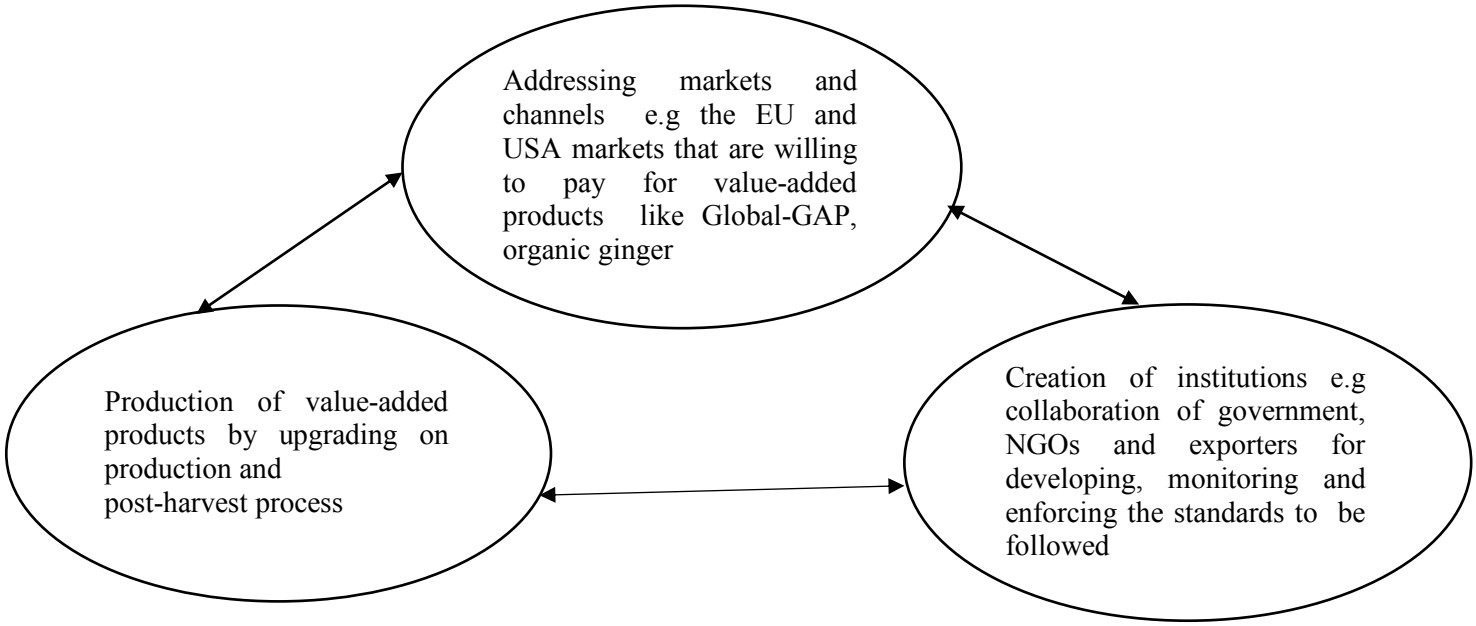


Figure 5-11: Illustration of upgrading options of Myanmar fresh ginger value chains

Chapter 6: Conclusions

The chapter is divided into four sections: summary of the research, implications of the research, study limitations and further recommendations for future research.

7.1. Summary of the research

It has been projected that demand for fresh ginger will be an increasing trend in international high price markets in the foreseeable future. Although ginger is not yet a priority crop in Myanmar, it has high potential for expansion because it is already a major cash crop in Southern Shan State of Myanmar and grown by approximately 6,000 farmers in the area. Moreover, Myanmar has comparative advantages in this sector when compared to major ginger producers in the region. It is a traditional crop grown by the farmers over generations. In this context, the present study was carried out on the upgrading the fresh ginger value chains of Myanmar with the aim of better understanding of exporting Myanmar fresh ginger to high value markets.

Based on the research, Myanmar fresh ginger value chains have been facing a number of constraints and challenges similar to many commodity value chains in other developing countries. Nevertheless, access to market information is not a major constraint for most of the actors along the chain in Myanmar due to availability of modern communication facilities such as mobile phones and social media, along with the support from certain NGOs. However, many farmers in the chain have been facing difficulties in production, harvesting on time and post-harvest practices due to cash flow and management constraints. Also transportation of farm inputs and products due to scarcity of labour and the remote location of farms is a challenge.

Since Myanmar has been exporting fresh ginger to the regional markets that have low requirements on food safety and quality, many actors in Myanmar have not focused on these aspects for many decades. This behaviour could be attributed to the non-availability of incentives for the actors for their additional value-adding efforts such as washing, cleaning and grading. Moreover, these regional markets are not reliable for Myanmar fresh ginger and, hence, Myanmar needs to find how to upgrade the fresh ginger value chains to export toward

high price markets for long-term benefits. With the support of certain NGOs, particularly, Winrock International, Myanmar has been exporting fresh ginger to the USA since 2018 as pesticide-free fresh ginger. In order to increase the volume of exports into this market, in the future, it is imperative to grow ginger which meets either Global-GAP or organic standards. The major constraints for achieving those standards are current use of chemical herbicides, practice of harvesting mother rhizomes, lack of technical support for pests and disease control measures, limited support in terms of technical and financial terms by the exporter, and lack of multi-disciplinary research on ginger.

The other major constraint found from this study was the poor post-harvest management by the actors involved. The interview results indicate that about 10-50% of losses occur during transportation and storage period, and these losses are attributed to factors such as poor road infrastructure, use of old trucks, improper packaging materials, and lack of storage facilities and technologies. Since value chain actors have been practising the traditional value chain, all the actors involved in the chain have not usually paid attention to post-harvest management, which is essential for the achievement of Global-GAP and organic certificates. Moreover, the unstable price of fresh ginger and volatility of the currency exchange rate have been impacting on exporting Myanmar fresh ginger.

Apart from those constraints, this research revealed the importance of leadership in order to achieve the certificates, aiming to have a good market for Myanmar fresh ginger in the long term. In that case, the role of exporters would be critical as they can understand the market requirements, as well as situations of local context in the country. Exporters can initiate a value chain financing, mechanism and training of producer groups to empower farmers to adopt better management practices. These producers groups play an essential role for achieving those certificates as well as reducing the transaction cost by collective approach. If Myanmar exporters commenced collaboration with the importers in the USA in developing the standards, it would bring several advantages for upgrading the Myanmar fresh ginger value chains. Collaboration of government with NGOs for research and development on productivity improvement is vital to meet the requirements by the high price markets.

On the other hand, there are many opportunities for the Myanmar fresh ginger sector. Having favourable climatic conditions for ginger production and the practice of crop rotation enables the production of ginger either through Global-GAP or the organic certification program.

With the export tax of only two percent, this is an incentive for the fresh ginger export business. In recent years, it has been found that there are increasing number of ginger processors for both export and local markets. This suggests that there is also a good market for the ginger that is not qualified for export markets, enabling the exporters to export fresh ginger effectively.

7.2. Implications of the research

According to this study, there are a number of issues and challenges for Myanmar fresh ginger value chains, along with many identified opportunities. This study further reveals that international buyers from high price markets are interested to invest in the ginger sector in Myanmar, thus, creating employment opportunities to the stakeholders. If these overseas companies invest in the Myanmar ginger sector, there would be a direct link between the farmers and importers, suggesting that the farmers will receive higher prices, enabling them adopt new, sustainable crop management practices instead of conventional weed control, as well as pests and disease management.

In addition to these opportunities, some exporters are planning to establish a processing factory in order to create an effective ginger business, both in fresh and processed form. This research will also provide an instigation to the NGOs that are supporting the ginger sector in Myanmar to provide grants to the exporters, as they are identified as the leaders in exporting the fresh ginger from Myanmar. These types of grants to the exporters may be utilized to expand or operate their ginger business effectively by also investing in transportation and storage facilities.

This study focuses on a better understanding of exporting Myanmar fresh ginger to the high price markets. It highlights the importance of adequate and effective collaboration between farmers and exporters in order to meet the requirements by the high price markets. The direct collaboration between farmers and exporters would increase the benefits to the farmers as they could receive higher prices through skipping the role of middlemen. Simultaneously, the farmers may receive additional support from the exporters in terms of technical, as well as financial aspects in the future. Additionally, a guarantee can be provided for the farmers that their produce will be bought with the positive hedge in an event of local price fluctuation, as long as the product quality meets the specific market requirements. As the present study

highlights the necessity of either organic or Global-GAP certified ginger for high price markets, the farmers may be able to produce ginger through sustainable farming method. It would enable the farmers to continue cultivating of ginger over a long period without land and environmental degradation.

For the exporters, working directly with the farmers can also bring several advantages. First of all, they will get a cheaper price for ginger in the absence of middlemen, and, secondly, higher chances to meet the requirements by the markets as the exporters have the authority to provide a market price instrument and technically know how to monitor the production process. Finally, ginger exporters would be entitled to Government support for effective operation of their businesses as an appreciation of export contribution in term of foreign earnings to the country's GDP.

As there has been limited R &D on the ginger sector in Myanmar, this study could encourage the Department of Agriculture to support and conduct a multi-disciplinary R & D program on this sector. It could create more technical knowledge for the actors who are directly or indirectly involved. In addition to these actors, there are many NGOs in Myanmar that have been supporting or are interested in supporting the ginger sector in Myanmar. It is expected that this study's findings would be helpful for these NGOs to get clear ideas of which areas of the ginger sector should be supported. This research has illustrated the need for enhanced coordination among the actors, particularly farmers, exporters and the Government. It also provides empirical evidence to policy makers in the Government sector to develop policy and participate in upgrading the fresh ginger value chains in future. A further implication of this study is that a comprehensive and recent compilation of literature on ginger value chains would be available for future researchers, as well as for students.

7.3. Study Limitations

Southern Shan state is the major ginger production area in Myanmar and about 84 % of nationwide production comes from this region. There are six townships in the area that grow ginger as a major cash crop. Nevertheless, only two townships, Kalaw and Hopong, were able to be studied due to time and budget constraints. One organic fresh ginger exporter in Myanmar, who has exported into France since 2017, was not involved in this study since the exporter bought the ginger from the farmers in a township which were not included in the

selected study area. Hence, certain information, particularly export information to France, is missing in this research. Additionally, there are very limited references on ginger sector in Myanmar and, hence, getting the relevant references for this study was challenging for the researcher.

With respect to the domestic consumption and export volume, exact data were not readily available. According to the ginger assessment done by Winrock International in 2016, it was reported that 40 % is consumed by the local market and 60% is exported to other countries. In contrast, during the data collection stage, the traders in Aungban market commented that only 10% is absorbed by the local market and, hence, 90% has to be exported.

7.4. Future research recommendations

Given resource and time constraints, this research was confined to only two townships: Kalaw and Hopong in Southern Shan State of Myanmar. It would be interesting to extend this research to other four major ginger growing townships in the Southern Shan State and explore the state fresh ginger value chains in these townships. Further it is worthwhile to quantify the value chain wide benefit of the proposed study. The research frame work could also be adapted to study organic or Global-GAP fresh ginger value chains targeting for export markets.

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Annex -1. Herbicide used by the ginger farmers whom interviewed

Annex-2: Interview Questions to Ginger farmers

Date:…….

I. Participants' General Information

1. Name:……. Contact details……
2. Age…….
3. Gender……
4. Education……

II. Farming and post-harvest management

5. On how many acres of land do you grow ginger?
6. Which variety do you grow and why?
7. How often do you change the variety? Why?
8. Do you spray the pesticides?
9. If yes, how often do you spray per season?
10. Do you use the herbicides?
11. If yes, how often do you spray per season?
12. What kind of cropping system do you practice for the ginger crop (e.g crop rotation, fallow)? Why?
13. Do you think the crop rotation and fallow practice you use have an effect on the use of herbicides and pesticides?
14. If yes, please explain why/why not?
15. How do you select the seed rhizomes for cultivation purposes?
16. What are the criteria of the seed rhizomes? (e.g size, color etc)
17. How many kg of fertilizers do you use per acre? Why?
18. How many kg of manure do you use per acre? Why?
19. What is the average yield of ginger per acre?
20. How long have you grown ginger as a commercial crop? Why?
21. Is the ginger production your main business? If not, to what extent does it contribute to your income?
22. How long does it take to harvest the ginger?
23. How many times to you harvest ginger per season? Why?
24. What is the main reason for ginger harvesting (e.g price, money requirement)?

25. How do you store ginger after harvest?
26. How long do you store ginger? Please explain why/why not.
27. Do you sort and grade before you sell to the markets? Please explain why/why not.
28. What kind of ginger form do you sell? (e.g fresh, dry)
29. What is the ginger production cost and profit per acre of land?
30. Apart from ginger production, do you have other businesses related to ginger? (e.g ginger buying and selling)
31. If yes, which factors made you do so?
32. Which one is more profitable? (Ginger production or buying/selling)

III. Resources and Infrastructures

33. How do you transport your inputs to the farms?
34. How do you transport ginger products to markets?
35. What kind of transportation materials do you use when you transport ginger to the traders? Why?
36. Have you faced any problems in ginger production such as pests and disease problems, decline soil fertility etc?
37. If yes, how did you manage it?
38. Have you got any access to credit? Please explain why/why not.
39. If yes, where do you get it from and to what extent does it contribute to your business?

IV. Relationship with other actors

40. Who are your input suppliers? Why them?
41. Who are your ginger buyers? Why them?
42. Do you have an agreement with the buyers/input suppliers? (e.g contract)
43. If yes, what are the terms and conditions of the contract? (e.g price, quality, interest rate, volume etc)
44. Are you a member of an association/group?
45. If yes, please explain what kind of association/group?
46. What are the pros and cons of being a member?
47. Have you tried joint purchasing of inputs such as fertilizer, pesticides, and seeds with other farmers? Please explain why/why not.
48. If yes, what are the pros and cons of the joint purchasing?
49. Have you tried collective selling of ginger products? Please explain why/why not.

50. Have you faced payment delay by your buyers?
51. If yes, how did you manage it?

V. Market Information and Access

52. How and where do you get market information? (e.g price, quality etc)
53. Do you get the same price for all ginger you have sold? Please explain why/why not.
54. Have you tried price negotiations with the buyers? Please explain why/why not.
55. Have you faced weight differences between your and traders' measurements?
56. Have you got any access to better markets? Please explain why/why not.
57. Do you know where the ginger you sold goes to? Please explain why/why not.
58. How do you interpret the market price of ginger? Is it stable? Please explain why/why not.

VI. Institutional Support

59. Have you got any support from your buyers, government or NGOs or any other associations to get better quality, higher yield? (technical training, exposure trip, providing quality seeds and fertilizer, etc.)
60. If yes, please explain from where and how it effects your ginger business (e.g. quality, yield etc.)?
61. Have you tried to get the certificate (e.g. organic, GlobalGAP etc.)?
62. If yes, where did you get it from and who supported you to get that certificate?

VII. Drivers in fresh ginger value chains

63. Who are the leaders of Myanmar fresh ginger value chain?
64. Who drives the fresh ginger value chain in Myanmar?
65. What is your opinion of the whole chain? (e.g too many actors, relationship of the actors along the chain etc)

VIII. Future plans

66. Do you have plans to expand your ginger business? Please explain why/why not.
67. If yes, how are you going to expand and what would be the major challenges to do so?

Appendix-3 : Interview questions to traders/agent/wholesalers/retailers

Date:……

I. Participants' General Information

1. Name……... Contact details……
2. Age…….
3. Gender…….
4. Education ……

II. Business Characteristics

5. How long have you worked in your business?
6. Which driving factors made you to do this business?
7. How many tons of ginger do you trade per year?
8. What forms of ginger do you trade and why?
9. Do you buy sorted and graded ginger from your suppliers? Please explain why/why not.
10. Do you sort and grade before you sell to your buyers? Please explain why/why not.
11. If yes, how many grades do you make?
12. What are the criteria of each specific grade?
13. Do you trade ginger the whole year or during ginger season only?
14. Have you bought ginger from a group of farmers?
15. If yes, please explain the differences between buying from individual farmers and a group of farmers?
16. Which one do you prefer? Why?
17. What is the profit margin of your business?

III. Relationship with the actors

18. Who are your suppliers? Why them?
19. Who are your buyers? Why them?
20. How do you try to get trust by your suppliers/buyers?
21. Do you have any agreements with them? Please explain why/why not.
22. If yes, please explain what are the terms and conditions of the agreement?

23. What are the pros and cons of the agreement?
24. Have you tried to negotiate the price with your suppliers? Please explain why/why not.
25. If yes, how did you negotiate it?
26. Have you tried to negotiate the price with your buyers? Please explain why/why not.
27. If yes, how did you negotiate it?
28. Have you faced any difficulties in communicating with your suppliers? Please explain why/why not.
29. Have you faced any difficulties in communicating with your buyers? Please explain why/why not.
30. Have you worked with other actors in a business partnership? Please explain why/why not.
31. If yes, what are the pros and cons of a business partnership? What are the risks and rewards sharing policies between the partners?

IV. Resources and Infrastructure

32. How do you transport the products?
33. Have you faced any difficulties in transporting your products? Please explain why/ why not.
34. What kind of storage technologies do you use? Why?
35. What kind of storage facilities do you use? Why?
36. Have you faced any problems in storing the products? Please explain why/why not.
37. What percentage of ginger has been wasted per year due to improper transportation and storage facilities? How did you manage it?
38. Have you got access to credit? Please explain why/why not.
39. If yes, what is the interest rate?
40. If yes, where do you get it from and to what extent does it support your business?

V. Market Access

41. How and where do you receive market information? (price, quality)
42. Are you aware of the market requirements? (e.g quality, size, volume etc)
43. Have you faced the situation where you cannot provide the requirements of the markets? Please explain why/why not.
44. How does it affect your business?

45. How do you interpret the market price of ginger? Is it stable? Please explain why/why not.

VI. Institutional Support and rules

46. Have you got any supports from government, NGOs or other associations to get better market access, better quality product etc? Please explain why/why not.
47. If yes, how do they support you and to what extent does it help your business?
48. How have government policies such as tax policies, labor law impacted your business?

VII. Future Plans

49. Do you have plans to expand ginger business? Please explain why/why not.
50. If yes, how are you going to expand and when?
51. What would be the major challenges to do so?

Appendix-4 : Interview questions to exporters

Date:……..

I. Participants' General Information

1. Name……... Contact details……
2. Age…….
3. Gender…….
4. Education ……

II. Business Characteristics

5. Is ginger export your main business?
6. If not, to what extent does it contribute to your export business?
7. How long have you exported ginger?
8. What driving factors make you export ginger?
9. How many tons of ginger do you export each year?
10. How many times do you export ginger each year?
11. What kind of ginger forms do you export and why?
12. Have you tried contract farming with farmers?
13. If yes, when did you try?
14. What are the terms and conditions of the contract farming?
15. What are the pros and cons of contract farming?
16. What is the profit margin of your business?

III. Resources and Infrastructure

17. How do you transport your products to export?
18. What kind of transportation materials do you use when you delivered the products to buyers? Please explain why.
19. What kind of storage facilities do you use? Why?
20. What kind of storage technology do you use? Why?
21. Have you faced difficulties in storage? Please explain why/why not.
22. What percentage of ginger has been wasted due to improper storage/transport facilities per year?
23. Have you got access to credit? Please explain why/why not.

24. If yes, where do you get it from?
25. What is the interest rate?

IV. Relationship with the actors

26. Who are your suppliers? Why them?
27. Who are your buyers? Why them?
28. How did you build a relationship with them?
29. Do you have an agreement with them? (e.g contract)
30. If yes, what kind of agreement and what are the terms and conditions of the agreement?
31. Have you tried price negotiations with the suppliers? Please explain why/why not.
32. Have you tried price negotiations with the buyers? Please explain why/why not.
33. Have you shifted new suppliers/buyers? Please explain why/why not.
34. Have you provided support to your suppliers in order to get the quality and quantity you required? Please explain why/why not.
35. Have you faced any conditions where your suppliers cannot provide the quality you required?
36. If yes, how did you manage it?
37. How did you build relationships with other actors (e.g government, NGOs etc)?
38. Are you satisfied with the relationship between you, and other actors such as suppliers, buyers, government, NGOs? Please explain why/why not.
39. Do you have business partners? Please explain why/why not.
40. If yes, what are the risk and reward sharing policies between you and your business partners?

V. Market Access

41. How and where do you get market information such as price, quality, quantity, and other requirements like Phytosanitary certificate?
42. Have you faced any conditions where you cannot provide those requirements? Please explain why/why not.
43. How has it impacted on your business?
44. Have you faced any delay in payment by your buyers?
45. If yes, how did you manage it?
46. Have you shifted the export markets? (e.g from India to EU). Please explain why/why not.

47. Have you diversified the markets? Please explain why/why not.
48. Who are the major competitors of ginger exporting from Myanmar in these markets?
49. What are the requirements by each market you exported? (e.g Global-GAP, Organic certificate, specific quality etc)
50. Have you faced rejection of your products by the importing countries because of not meeting their requirements?
51. If yes, what did you face and how did you manage it?
52. Is it difficult to meet the requirements of importing countries for Myanmar exporters? Please explain why/why not.
53. Have you tried to get a certificate from a third party in order to get the higher price and meet the requirements in the export markets? Please explain why/why not.
54. If yes, please explain what kind of third party and the process of getting the certificates?
55. What are the requirements of the certificate?

VI. Institutional Support and Rules

56. Have you got any support from government, NGOs or other associations to get better market access, quality etc?
57. If yes, where do you get it from and how do they support you?
58. How has it impacted on your business?
59. What kind of government regulations such as taxation, labor law, export policies have affected your business?

VII. Future Plans

60. Do you have plan to expand the ginger business? Please explain why/why not.
61. If yes, how are you going to expand and when?
62. What would be the major challenges to do so?

Appendix-5: Interview questions to processors

Date:…….

I. Participants' General Information

1. Name……... Contact details……
2. Age…….
3. Gender…….
4. Education ……

II. Ginger Processing Information

5. How long have you worked ginger processing?
6. Why did you decide to do this business?
7. Is this your main source of income? If not, to what extent does it contribute to your income?
8. Do you do ginger processing throughout the year? Please explain why/why not.
9. How many ginger products do you make?
10. What are they and why them?
11. What is the profit margin of ginger processing?

III. Relationship with the actors

12. Who are your suppliers? Why them?
13. Who are your buyers? Why them?
14. Do you make any agreements with your suppliers and buyers?
15. If yes, please explain what are the terms and conditions of the agreements?
16. What are the pros and cons of making the agreements?

IV. Market Access

17. How and where do you get market information such as price, quality, volume etc?
18. Are you aware of the market requirements? (e.g quality, volume, package size etc)
19. Have you tried price negotiations with suppliers? Please explain why/why not.
20. Have you tried price negotiations with buyers? Please explain why/why not.

V. Future Plans

21. Do you have plan to expand your ginger business in the future?
22. If yes, what would be the major challenges to do so?

Appendix-6: Interview questions to NGOs

Date:…….

I. Participants' General Information

1. Name……... Contact details……
2. Age…….
3. Gender…….
4. Position …….

II. Ginger support activities

5. How long have you supported ginger activities?
6. Why have you decided to support ginger activities?
7. What kind of activities have you supported? Why them?
8. How many actors in the chain have you supported? Why them?
9. Have you seen any impacts of your support yet? Please explain why/why not.
10. If yes, what are the major changes after your support?
11. Have you worked with other organizations (e.g DOA, agriculture universities, NGOs) to implement these activities? Please explain why/why not.
12. If yes, what are the pros and cons of collaboration with these institutions?
13. What are the major constraints in implementing ginger activities?
14. How did you overcome them?
15. What are the major weaknesses of the Myanmar fresh ginger value chains?
16. What are the opportunities for Myanmar fresh ginger value chains?
17. How can Myanmar catch these opportunities?

III. Future Plan

18. What kind of ginger activities are you going to implement/continue? Why?
19. Who are you going to be supported by? Why them?
20. What would be the major challenges to do so?

Appendix-7: Interview questions to Department of Agriculture (DOA) at township level

Date:……..

I. Participants' General Information

1. Name……... Contact details……
2. Age…….
3. Gender…….
4. Position …….

II. Supports and constraints in ginger production

5. What kinds of problems are faced by the ginger farmers? (e.g pests, diseases, variety, market, quality, transportation, post-harvest etc)
6. How does DOA support ginger farmers? (e.g extension services)
7. How often does DOA communicate with the farmers?
8. Have you collaborated with NGOs or other organizations to support ginger activities in the township?
9. If yes, please explain how do you collaborate with them?
10. What are the pros and cons of collaborating with these institutions? What are the constraints in supporting ginger farmers (e.g financial constraints, transportation etc)?

III. Future Plans

11. Do you plan to support/ continue to support ginger activities?
12. If yes, please explain the plan and when you are going to support?
13. What would be the major challenges to do so?

Appendix-8: Interview question to a Certification body

Date:……..

I. Participant's General Information

1. Name……. Contact Details……
2. Age …….
3. Gender…….
4. Position……

II. Business Characteristics

5. How long have you worked in Myanmar?
6. Why have you decided to work in Myanmar?
7. How many organizations have worked with you?
8. How many certificates do you provide in Myanmar ? What are they?
9. What kind of certificates are demanded by the organizations in Myanmar? Why?
10. What is the process of each certificate?
11. What is the cost of getting each certificate?
12. To how many organizations/farmers have you provided the certificates?
13. How many countries accept the certificates you provided?
14. What are they?

III. Challenges and Opportunities

15. What are the challenges for the organizations/farmers in Myanmar to achieve the certificates?
16. What are the opportunities for the organizations/farmers in Myanmar to achieve the certificates?

Appendix-9: Questionnaires to the importers in the USA

Date:……

I. Participants' General Information

1. Name……... Contact details……
2. Age…….
3. Gender……..
4. Position……..

II. Ginger import from Myanmar

5. How many ginger products do you import from Myanmar?
6. What are they and why them?
7. What are the driving factors to import ginger from Myanmar?
8. How long have you imported ginger from Myanmar?
9. What percentage of Myanmar ginger contributes to your ginger business?

III. Ginger importing countries

10. From how many countries do you import ginger?
11. What are they and why?
12. What are the major differences between Myanmar ginger and gingers from the other countries you imported? (e.g quality, size, price etc)
13. How many times do you import ginger from Myanmar per year?

IV. Requirements by the market

14. What are the requirements by the US markets? (e.g Phytosanitary, Global-GAP certificates etc)
15. What is the price difference between certified ginger and ginger without a certificate such as GAP, organic certificate?
16. Can the suppliers in Myanmar provide these requirements?
17. If not, what specific requirements cannot be provided by Myanmar suppliers?
18. In that case, how did you manage it? (e.g you may shift to other suppliers)

V. Relationship with the suppliers in Myanmar

19. How many suppliers do you have in Myanmar? Why them?
20. How long have you worked with them?
21. Have you shifted suppliers in Myanmar?
22. If yes, when did you shift and why?
23. Have you faced any delays in product delivery from your suppliers in Myanmar?
24. If yes**,** how many times have you faced it and how did you manage it?
25. How often do you communicate with your suppliers?

VI. Constraints and Opportunities of Myanmar ginger in the world markets

26. In your opinion, what are the constraints of Myanmar ginger to enter into the world market effectively?
27. How could these be overcome?
28. What are the opportunities for Myanmar ginger in the world market?
29. How can Myanmar catch these opportunities?
30. What forms of ginger might be popular in the future? Why?

VII. Future Plans

31. Do you have plans to expand the ginger business in Myanmar? Please explain why/why not.
32. If yes, what kind of business and when are you going to start?
33. What would be the major challenges for you to do so?

Appendix-10: Ethical Approval

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

Date: 15 January 2019

Dear Phoo Phoo

Re: Ethics Notification - **4000020471** - **Upgrading Of Myanmar Ginger Value Chain**

Thank you for your notification which you have assessed as Low Risk.

Your project has been recorded in our system which is reported in the Annual Report of the Massey University Human Ethics Committee.

The low risk notification for this project is valid for a maximum of three years.

If situations subsequently occur which cause you to reconsider your ethical analysis, please contact a Research Ethics Administrator.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

A reminder to include the following statement on all public documents:
"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Professor Craig Johnson, Director - Ethics, telephone 06 3569099 ext 85271, email humanethics@massey.ac.nz."

Please note, if a sponsoring organisation, funding authority or a journal in which you wish to publish requires evidence of committee approval (with an approval number), you will have to complete the application form again, answering "yes" to the publication question to provide more information for one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

Yours sincerely

Research Ethics Office, Research and Enterprise
Massey University, Private Bag 11 222, Palmerston North, 4442, New Zealand **T** 06 350 5573; 06 350 5575 **F** 06 355 7973
E humanethics@massey.ac.nz **W** http://humanethics.massey.ac.nz